NOTES

ON THE

KURIL ISLANDS.

BY

CAPTAIN H. J. SNOW, F.R.G.S.

LONDON:
JOHN MURRAY, ALBEMARLE STREET.
1897.

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Dr. Leonhard Stejneger

with Compliments

of H. J. Snow.

Yokohama

May 1897.

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NOTE.

By PROFESSOR JOHN MILNE, F.R.S.

THE only maps in which very many of the places mentioned in the following notes can be found are the Admiralty Charts, numbered 2128 and 2405.* Any one who compares these notes and charts, the originals of which were drawn by Captain H. J. Snow, with the scanty literature and imperfect maps previously existing, will at once recognize how very much has been accomplished by the patience and perseverance of an individual. New rocks and shoals have been indicated, whilst supposed dangers of a like character have been removed. The position of islands have been corrected relatively and in longitude, whilst anchorages, tide rips, watering-places, sea-lion and seal rookeries, have been located and described. The shortest route between Vancouver and certain ports on the Asiatic coast has been freed from uncertainties and dangers, while Canadian-Pacific steamers, whalers, and a large fleet of pelagic hunters have now harbours of refuge opened which may be approached with comparative safety. In short, after shipwrecks, risks, and dangers, the escapes from which have often seemed incredible, independently of the geological, natural history, and general scientific notes which have been collected, Captain H. J. Snow, whilst sacrificing by his publications his own professional interests as a hunter, has entitled himself to recognition from all who navigate and patrol the fog-bound shores of the rocky Kurils.

SHIDE, NEWPORT, I.W.,
October 19, 1896.

* Appended to this memoir.

INTRODUCTION.

THE Kuril Islands being but little known geographically or otherwise, the following notes may perhaps be of some small value.

They are the outcome of many visits, extending over a number of years, in the course of which every island has been visited, and each one circumnavigated many times.

The remarks upon the physical features of the islands, the climate, winds, currents, inhabitants, fauna and flora, are all from personal observations. For a few general particulars as to their discovery, annexation by Russia, eruptions of volcanoes, etc., I am indebted to various authorities.

The heights of the mountains given are from sextant observations, and are generally the result of an average of a number of sights, taken at various times, and at different distances; so they may, I think, be taken as approximately correct.

On the charts * accompanying these notes the positions and forms of many of the islands will be found to differ considerably from any hitherto published.

These maps, although not absolutely correct, will I trust be sufficient for all practical purposes of navigation.

Many of the bays, capes, islets, and mountains of the Kurils, not being named on any published charts, in describing them I have called them by the names by which they are generally known to the hunters frequenting the islands.

H. J. SNOW.

JAPAN,
1893.

* By permission of the Hydrographer, the Admiralty Charts of the Kuril Islands, with Captain Snow's corrections, accompany this memoir.

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By CAPTAIN H. J. SNOW, F.R.G.S.,
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I.

HISTORY OF THE OCCUPATION OF THE ISLANDS.

The Kuril Islands were discovered by De Vrees, a Dutch navigator, in 1634. They are also said to have been discovered in 1654 by a merchant named Taras Stadukin, who sailed from the Kolyma River. He passed through Bering Strait, and followed the coast of Kamchatka, doubling the southernmost cape, and making the discovery of the Kurils.

In 1711 the Russians first invaded the islands, and in 1736 all these to the north of Yetorup became subject to Russia.

In 1738 Spanberg sailed with three small vessels to examine the Kurils, and wintered in Kamchatka.

In 1766–7 a voyage was made amongst them to collect a fur-tax, and in 1795 the Russian-American Company established a factory on Urup.

Towards the end of the eighteenth century the Japanese established themselves on Yetorup, and in 1806–7 the Russians made descents on that island.

In November, 1830, the Russian-American Company took formal possession of the Kurils.

In 1875 all the Kurils north of Yetorup were handed over to Japan by Russia, in exchange for the southern part of Saghalin.

In 1884 the Japanese government removed the few remaining Kurilsky Ainu to the island of Shikotan, thus leaving the islands from Urup to Shumshir without a single inhabitant.

II.

PHYSIOGRAPHY AND GEOLOGY OF THE ISLANDS.

ALTHOUGH these islands, with the exception perhaps of the two southernmost, Yetorup and Kunashir, are never likely to be of much commercial importance, they are of interest as forming part of the long line of volcanic vents extending along the western side of the Pacific Ocean from Northern Kamchatka, down that peninsula, through the Kurils, Yezo, and Japan, to the Phillipines.

Professor John Milne, F.R.S., of the Imperial University of Japan, our great authority on earthquakes and volcanoes, has published some notes on the Kurils which he made in 1878, when on a flying visit to these islands, which notes were supplemented by others made on one or two subsequent visits to Yetorup and Kunashir.*

The Kuril chain of islands extends in almost a straight line in a north-east direction, from the east coast of Yezo to the southern extremity of Kamchatka, a distance of about 630 geographical miles. This line may be regarded as a line of weakness in the Earth's crust, out of which, at fairly equally spaced intervals, volcanic materials have been ejected to form islands. Parallel with the main fissure, on its western side, is a second line of vents at wider intervals, and apparently of more recent origin. This line runs through Alaid, Shirinki, Makanrushir, Ekarma, Chirinkotan, Raikoke, and Makanruru to the volcanoes on the peninsulas standing out from the north-west coast of Yetorup (which, from appearances, were once separated from that island), and across to the Sirotoko peninsula of volcanoes forming the north-east point of Yezo.

The islands nearest to Yezo—Kunashir and Yetorup—are evidently the oldest, and at one time may have been connected with Yezo, their fauna and flora being identical. Next in age,

* *Trans. Seis. Soc.*, vol. ix. pt. ii. 1886; *Geolog. Mag.*, Dec. 2, vol. vi. and vol. vii.

apparently, come the northern islands of Shumshir and Paramushir, which were undoubtedly once joined to Kamchatka. The most recent are the smaller islands of Chirinkotan, Black Brothers, Ushishir, Shirinki, Raikoke, and Ekarma, whilst the Mushir rocks, Avos rocks, and Srednoi rocks, are probably islands just beginning to make their appearance above the sea.

In formulating this chronological sequence, the oldest islands are considered to be those where there is a fair development of sedimentary rocks—a rounded appearance which has gradually been produced by subaerial denudation; where volcanic activity is at a minimum; and where animals and plants are numerous. The youngest members of the group, on the contrary, I regard as being those where sedimentary rocks are absent—the mountains are sharp, and not materially altered by denudation; where volcanic activity is at a maximum; and where animals and plants are comparatively scarce.

The separation of the northern and southern islands from Kamchatka and Yezo respectively, has been caused partly by marine denudation, and partly perhaps by volcanic action, which, building up huge mountain masses in one place, may have caused a slow subsidence in others.

There is abundant evidence that the Kurils are being pushed up bodily above the sea, as well as being built up by ejectamenta from volcanic vents. Judging from signs on the shores, and reports of old navigators, we may conclude that this elevation is going on, or has gone on, at a comparatively rapid rate. For instance, quantities of driftwood, composed of big trees, are found up some of the valleys some 30 or 40 feet above the height to which the sea now rises. These heaps of old drift-stuff are partly buried in the earth, and overgrown with grasses and coarse vegetation. On the south-east coast of Matau there are terraces and beach-lines one above another, to perhaps 100 feet above the present shore. In an old "China Sea Directory," I find the following in a note on the Black Brothers (Brat Chirnoi): "A reef, which much resembles an artificial breakwater, extends a mile east from its north point, and at its extremity is a long rock."

At the present time this is part and parcel of the island, the "reef" being a sandy neck of land some 50 feet high, and overgrown with grass. Buried in the sand of this ridge, and even on

the top of it, there is considerable driftwood. Again, Shiashkotan, from appearances, was originally two islands. It has a mountain mass at each end which slope with a long sweep towards the middle of the island, where it is not more than half a mile wide, flat on top, and only about 100 feet above sea-level. Steep cliffs bound it on both sides, and on these, in places near the top, water-worn boulders marking old beaches are to be seen.

The process of island formation is still going on in the Kurils, and on more than one occasion I have witnessed submarine eruptions which are evidence of this process.

The total area of the Kuril Islands is 2860 geographical square miles.* The area of each island, arranged according to size, is as follows:—

Yetorup	930	Brought forward ...	2823
Paramushir	562	Kharimkotan	16
Kunashir	444	Ekarma	$5\frac{1}{2}$
Urup	298	North Black Brother ...	$3\frac{3}{4}$
Simushir	126	South Black Brother ...	$3\frac{1}{4}$
Onekotan	121	Makanruru	2
Shumshir	89	Shirinki	$1\frac{3}{4}$
Shikotan	70	Ushishir	$1\frac{1}{2}$
Alaid	46	Raikoke	$1\frac{1}{4}$
Ketoi	35	Chirinkotan	1
Shiashkotan	34	Bird rocks	1
Rashau	25	Mushir rocks	
Makanrushir	21	Srednoi rocks	
Matau and Puffin Island ...	20	Avos rocks, etc.	
Carried forward ...	2823	Geographical square miles	2860

The cluster of low flat islands lying between Cape Noishaf, the extreme eastern point of Yezo, and Shikotan, can scarcely be considered as belonging to the Kurils proper. They once formed part of the cape, through which the sea made breaches and scoured out channels, forming five islands and numberless islets, reefs, and rocks. Their total area is $28\frac{1}{2}$ square miles: Shibotsu, $17\frac{1}{2}$; Suisho, $3\frac{3}{4}$; Taraku, $3\frac{3}{4}$; Yuru, $2\frac{1}{2}$; Akiyuri, Harukaru, and the other islets together making about 1 square mile.

* In the "Encyclopædia Britannica," the area of Yetorup is given as 2656 square miles; Paramushir, 1135; Urup, 563; Onekotan, 244; Shumshir, 226; and Simushir, 161. How these areas were arrived at it is difficult to imagine. In the majority of the areas given the quantities are double what they should be, and in the case of Yetorup three times, or thereabouts.

With the single exception of Shumshir, all the islands are mountainous and of volcanic origin.* Active, dormant, or extinct volcanoes are found on every island with the exception mentioned. The heights range from 1360 feet (Ushishir) to 7640 feet (Alaid).

In the Kuril Islands there are now twenty volcanoes from which steam issues. They are as follows: On Paramushir, northern part, 1; Chirinkotan, 1; Shiashkotan, 2; Matau, 1; Rashau, 1; Ushishir, 1; Ketoi, 2; Simushir, north-west side of Milne Mountains, 1; Black Brothers, 2; Urup, 2; Yetorup, 3; Kunashir, 1.

Those I have noticed sending forth lava-streams are Chirinkotan, Simushir, Black Brothers, Matau, and the volcano at the north-east end of Yetorup, on the south side of Bear Bay. From the craters of Chirinkotan and Matau, the red-hot lava simply appeared to well over the breached lip, and run down as a small stream along a scar in the side of the mountain. The remaining three I have seen in violent eruption, emitting clouds of black smoke, rocks, and ashes to a great height, accompanied by thundering noises which could be heard 50 miles or more away.

On one of my visits to the islands in June, 1879, I witnessed the formation of a new point of land at the Black Brothers. This was effected by a most remarkable, slow and gradual upheaval of the southern slope of the mountain, close to the sea.

This gradual raising went on under my very eyes, masses of black volcanic rock being pushed up from below, which at short intervals rolled down the slope and fell crashing and splashing into the sea. Watching an opportunity, I pulled my boat alongside this recently erupted rock, and found it quite hot, the heat, however, not being more than the hand could bear. From all parts of this newly formed point smoke or steam was issuing.

Notwithstanding a recent violent eruption from the crater, and this gentler one from the base of the mountain, innumerable guillimots, gulls, shags, and other birds, were located on the ledges of the cliffs, laying their eggs, close to the disturbed portion of the island. At each thundering and splashing noise made by the masses of rock rolling down, clouds of these birds would fly screaming off, to return and settle again a few minutes later.

How long this slow upheaval lasted I am unable to say. It was

* On Kunashir and Yetorup, forming a fringe round, and flanking volcanic nuclei, are horizontally stratified tertiary tuffs (Professor John Milne, F.R.S.).

going on the three or four days I remained around the islands, and judging from the distance to which the point was extended, the quantity and height of the mass, I should say it must have continued at least for some weeks.

In May, 1883, the volcano on the north-east end of Yetorup was in violent activity, sending forth smoke, stones, and ashes, accompanied by loud thunder-like rumblings. These thunderings and roarings, strange to say, appeared to be no louder when close beneath the mountain than when 30 or 40 miles away. On passing to leeward of the island, we were covered with fine ashes.

When passing the Black Brothers in June, 1879, quantities of ashes as fine as flour fell upon our decks, and we came to the conclusion that the volcano was in a state of eruption, although no sounds could be heard. A dense fog prevailed at the time, and the islands could not be seen. Later on, during paroxysms of greater activity, the usual detonations and thunderings were heard.

In the month of September, 1881, the parasitic cone on the north-west side of Milne Mountains, Simushir, was in active eruption. Red-hot lava trickled down its sides in numerous little streams, which at night gave the mountain the appearance of being covered with dull lanterns. During this eruption ashes and large pieces of rock were also ejected, which now strew the slopes and base of the mountain.

Matau and Chirinkotan I have only seen mildly eruptive, and unaccompanied by noise, except the hissing caused by the hot lava from the crater of Chirinkotan running into the sea.

There are numerous signs of many more of the volcanoes having been in active eruption in recent times.

One of the latest, perhaps, is the volcano on the north end of Shiashkotan. I first visited this island in 1878, and from appearances an eruption had not long previously taken place. At the base of the mountain near the beach, over an area of some two or three acres, were scores of loose heaps of burnt and sulphurous-looking earth, from some of which steam was issuing. In some places the yellowish-looking ground was soft and yielding, in others hard, with here and there pools and springs of water tasting strongly of alum, and depositing a whitish sediment. Where this water flowed into the sea, it discoloured it for a considerable distance.

The driftwood on the beach was also charred, and the growth

of short scrub in the vicinity burnt and killed. Twenty years before there is a record of an eruption.

The following is a record of volcanic activity of the Kurils, but there have undoubtedly been many other eruptions in modern times, of which no account has been taken :—

Alaid.—In 1770 it was smoking, and in 1793 it was in violent eruption. It is now dormant or extinct.

Paramushir.—According to A. Postels,* Fuss Peak and the volcano at the north end of the island were active in 1737, 1742, and 1793. A small quantity of steam is now given off from the volcano at the north end, but all the others are dormant or extinct.

Shirinki.—Described by Herman as active. No signs of activity have been shown during the past fourteen years.

Onekotan.—The volcano (Mount Blakiston) on the south end of the island described by Herman as being active. There is at present no active volcano on this island.

Kharimkotan.—Landgrebe and Herman speak of this being active. There are no signs of activity at this island now.

Shiashkotan.—Erupted in 1855. Both the volcanoes on this island are giving off much steam.

Ekarma.—Pallas describes flames as issuing from this at times. It is now dormant, but the warm springs at its base indicate that it has still the necessary element to become active again.

Chirinkotan.—Pallas describes this as active, lava and stones being occasionally thrown out. This answers to its present condition.

Raikoke.—In violent eruption in 1778 and 1780. It is now extinct or dormant.

Matau.—Described by Pallas as throwing out stones and lava. Steam now issues from this mountain, and occasionally a small stream of lava.

Rashau.—Steam issues from an old crater on the east side of the island.

Ushishir.—From fumeroles surrounded by a deposit of sulphurous earth inside the crater, steam is given off.

Ketoi.—Two volcanoes are at present steaming on this island. Violent eruption in 1843.

Simushir.—Only the small volcanic peak on the north-west side of the Milne Mountain group is now active. It was in violent eruption in September, 1881. The other volcanoes on the island do not show signs of any activity in very recent times.

Black Brothers (Brat Chirnoi).—The northern island is described by Krusenstern and Pallas as active. Steam issues from two peaks on this island, and periodically they show signs of considerably increased activity. Violent eruptions took place in 1879 (May–June).

Urup has two volcanoes, from which steam has steadily issued for the past fourteen years.

* References to Postels, Herman, Pallas, etc., are taken from 'Documents sur les Tremblements de Terre l'Archipel des Kouriles,' etc., par M. Alexis Perrey. 1863.

Yetorup.—Pallas describes the volcano at north-east end as continually throwing out flames and smoke. This mountain was in violent eruption in May, 1883. Steam now issues from it and four other volcanoes on this island.

Kunashir.—Steam issues from the crater of Rouse Mountain.

Hot springs are to be found on most of the islands. I have noticed them particularly on Kunashir, Yetorup, Ushishir, Rashau, Shiashkotan, and Ekarma.

On the western side of Rashau, about $3\frac{1}{2}$ miles from south cape, is a spring of warm water with a temperature of 111° Fahr. It emerges from the base of some high cliffs, and runs over a ledge of flat rocks, in which there are several crevices and hollows about as large as a good-sized bath tub. These hollows are always filled with the hot water, and make capital bathing-places. With this hot spring close at hand I never saw or heard of it being used by the natives who lived on this island. The water of this spring is clear, tasteless, and odourless, and does not discolour the rocks over which it flows.

Kunashir has boiling springs, and on Yetorup there are a number of hot springs, some of which are resorted to by the inhabitants for the cure of skin disease, rheumatism, etc.

Ushishir has a boiling spring inside the crater on the south-eastern side. Here, at the base of the hills, the ground widens out into a flattish area, on which a bank of sulphurous earth has been formed. Through this bank fumeroles emit steam, bright yellow flour-like sulphur being deposited around these orifices.

Close by this, and only a few feet above sea-level, are the springs of boiling mud and water. The hot water flows in a small stream into the basin of the crater. The water, as may be imagined, smells and tastes strongly of sulphur.

Ushishir, although one of the smallest islands of the group, is an exceptionally interesting one, partly on account of its formation, and also for the marvellous number of birds which resort to it during the summer season. A description of the place may perhaps be of interest.

The island is separated into two parts, joined by a bouldery reef. The northern portion is flattish on top, grass-grown, and about a mile in extent. The southern part, which is rather more than a mile in diameter, is a hollow volcanic crater which has been

breached on its south side, giving access to the sea. The outer entrance to this crater is between high perpendicular cliffs of rock on the west side, and a lofty dome-shaped rock, some rocky cliffs, and a ridge of sandy and pumiceous hills on the east side. A short distance inside the points two low bouldery spits run out, one from each side, and approach each other to within about 20 yards. Still further in is another spit, extending from the eastern side and reaching nearly across to the western side of the crater. On this spit there is a narrow but lofty peaked ridge, mostly overgrown with grass. Between the inner and outer spits the water is shallow, with a sandy bottom, there being only sufficient depth for a boat to pass in. Through the openings the sea flows in and out with the rise and fall of the tide.

After passing the second spit, you find yourself in a perfectly land-locked circular basin, the lips of which are from 500 feet to 1400 feet above you. The depth of water inside the crater, so far as I sounded it, I found to be from 5 to 23 fathoms. Near the centre of the basin there are two rocky grass-covered islets. The western walls of this crater, which are mostly of hard rock, are the highest and steepest, reaching to a height of 1360 feet in one place. From this side the crater lip gradually slopes round to the northern side, where it appears to be formed of pumiceous earth, and is about 800 feet high. Continuing round to the east and south-east, the crater walls become narrow and lower, until they are not more than 500 feet in height. There is a narrow beach all round the basin. It is only on the northern and eastern sides that it is possible to scale the walls of the crater.

From inside the basin the outer ocean is not visible; the water is as smooth as a mill-pond, and covered with countless numbers of seafowl, which make this island their breeding-place.

On a fine day here, shut in by the lofty walls of the crater, the blue sky visible above, against which myriads of birds are to be seen ceaselessly sailing to and fro, and round and round, in their silent flight, with no apparent object but the enjoyment of the exercise, and the clouds of steam quietly rising from the fumeroles and springs, the scene is most impressive. So much soundless motion, however, soon becomes oppressive, and one longs for the roar of the surf or something else to relieve the monotony.

This place is a veritable paradise for birds. There are no foxes

or other land animals, and this is the principal reason why there are so many birds. The burgomaster gull (*Larus glaucus*) makes its nest more or less all over the islands, around the hot spring and on the bank of sulphurous earth being favourite spots. Here I have often taken the eggs and cooked them in the boiling water of the springs. On the ledges of the rocks and cliffs, tens of thousands of guillemots (*Uria troïle* and *U. brünnichi*) lay their eggs and rear their young, whilst here and there amongst them are large colonies of Kittiwake gulls (*Rissa tridactyla*), with their nests perched on inaccessible shelves and in little hollows of the cliffs.

Hundreds of thousands of fulmars (*Fulmarus pacificus*) occupy every available grassy tussock and ledge on the steep sides of the island, both inside and outside the crater, whilst millions of little auks, of several species (*Phaleris cristatella* and *P. mystacea* being the most numerous), lay their eggs in the hollows and crannies of every nook and beneath every boulder all round the island.

Towards evening these little auks take their flying exercise. They gather in flocks of many thousands, and hundreds of these flocks will be in the air at one time, forming clouds which almost darken the atmosphere. They fly round and about the island, now rising high above the mountain, and then sweeping down with a great rush towards the water, to rise again and swerve off, and pass and repass each other—each flock as one bird—as if they were going through the intricate figures of a quadrille.

The guillimots, often accompanied by puffins, also take their evening exercise, but in a much quieter manner, theirs being a steady flight round and round the island in an endless line or band. All the birds that take this apparently regular exercise are confined to those species with comparatively heavy bodies and short wings.

Tufted puffins, black guillimots, and shags also breed here in large numbers. Horned puffins, parrot-billed auks, grey-headed auks, fork-tailed petrels, and Leach's petrels are common, but not numerous. Harlequin ducks are plentiful, but I never have been able to find their eggs. Wild geese (*Bernicla hutchinsi*) in limited numbers breed here also. The land-birds are confined to ravens, falcons, wagtails, and wrens.

Ushishir was the favourite station of the Kurilsky Ainu.

Earthquake shocks are frequent all along the Kuril chain of islands. I have experienced them on shore and on board ship, both when at anchor and when under way. Perhaps when a shock is felt on board a ship that is under way, the disturbance causing it is more likely to be a submarine eruption rather than an earthquake. When, however, a vessel is lying at anchor, she is attached to the earth by her anchors and cables, and an earthquake is communicated to the vessel through them.

On July 12, 1884, when sailing along the islands, about four miles to the westward of the Srednoi rocks, we felt the effects of a series of earthquake shocks, or more probably the commotion caused by a submarine eruption. About five o'clock p.m., when in my cabin, a noise like the running out of a line over a vessel's rail was heard. I thought a cast of the lead was being taken, as a thick fog prevailed at the time, and took no further notice. Some little time afterwards the same kind of sound again occurred, but much louder. On making inquiries on deck, I found that no one had noticed it. About six o'clock we were sitting down to our evening meal, when a violent trembling of the vessel, accompanied by a sound like steam blowing off from a boiler, took place. All hands rushed on deck, thinking the vessel had run on a reef; but all was quiet and as usual, the schooner slowly forging ahead with a very light south-south-east breeze. Several casts of the lead were taken, but no bottom found with all the line out. This same rushing noise and trembling of the vessel continued for nearly two hours, at intervals of about fifteen minutes, each time lasting about thirty seconds. No disturbance of the sea was noticed, but on account of the fog our range of vision was very limited. The temperature of the sea was as usual, 36° Fahr.

Although to those below the rushing noise like the blowing off of a steam boiler appeared to be very loud, those on deck could not hear it, notwithstanding that the trembling of the vessel was equally perceptible there. The sound must, therefore, have been communicated through the water, and was undoubtedly due to a submarine disturbance of some kind.

Some days after I visited the craters of Ushishir and Rashau, but they showed no signs of increased activity.

III.

INHABITANTS OF THE KURILS.

INHABITANTS.—The only islands of the Kuril chain which are at present inhabited are Yetorup, Kunashir, and the off-lying Shikotan. The number of people on these islands in January, 1891, was 2886, distributed as follows: Yetorup, 1343; Kunashir, 1476; and Shikotan, 67. At least three-fourths of the total number of inhabitants are Japanese, the rest are Ainu. Of the 67 people on Shikotan, all but two are Kurilsky Ainu.

Besides the permanent residents, Yetorup and Kunashir are visited during the fishing season—which extends over half the year—by several hundred fishermen, who are employed principally in the capture, salting down, and shipping of salmon and salmon trout, by Japanese having fishing rights in the islands.

Having unwisely ventured to try a winter season's hunting in the vicinity of the Kurils, I had the misfortune, on December 4, 1874, to be wrecked on the east coast of Yetorup, near Onebets, where we lived for twenty days in an Ainu hut. We then made our way through the snow across the island to the settlement of Furebets, on the north-west coast, where we were housed and most kindly cared for by the Japanese. There were no means of getting away from the island at that time of year, and we had to remain at Furebets until nearly the end of May, when a Japanese Government steamer called in, and we were sent down to Hakodate in her. The British Government showed its appreciation of the kind treatment we had received by distributing amongst those who had seen to our welfare presents to the amount of $500.

During this forced residence on Yetorup I saw a great deal of the aboriginal Ainu of the island, and since that time I have

on many occasions been amongst them. I have also had some experience of those inhabiting Yezo, Saghalin, and the Northern Kurils.

The Yetorup natives were, and are still, nearly all employed by the Japanese fish merchants. During the spring they take cod, later on salmon trout and salmon. The winter is chiefly occupied in wood-cutting.

The Ainu houses of Yetorup are similar to those of Yezo, being made of grass or reeds lashed upon a framework of wood. Sometimes slabs of bark are placed outside the grass. The roofs are high, of steep pitch, and thatched with grass. The windows are small and closed generally by a board, and the entrance is closed by a mat. There is a firehole in the centre of the house, and the smoke escapes through a hole in the roof.

On Yetorup I never met with Ainu occupying the half-underground dwellings, like those used by the natives of the islands farther north. The remains of these pit-dwellings are, however, very common.

For clothing these Ainu chiefly wear garments made of a cloth made from bark fibre, like those used by the Yezo natives, and mocassins reaching to the knee, made of salmon-skins.

The Yetorup Ainu are without treasures like old Japanese lacquered bowls, trays, tubs and boxes, etc., such as are seen in many native houses in Yezo.

These natives, like those of Yezo, are a broad-shouldered, thick-set, well-set-up, stalwart race, and, if washed and combed, might be counted handsome. Their shaggy heads and beards give them a wild appearance; but all idea of ferocity is at once dispelled on making their acquaintance, when one notes the gentle expression of their large soft brown eyes, and their low musical voice.

Many of the girls are comely and attractive, having clear fair skins, full European-looking eyes, well-formed limbs and bodies, and voices naturally softer and more musical than those of the men. Notwithstanding the hard life they lead, working just as hard as the men, they are brimful of fun and merriment.

The hairiness of the Ainu has, I think, been much exaggerated. As a rule the Ainu men have fine beards and moustaches, which they allow to grow to the fullest extent. They are also hairy about the body and limbs, but not more so than very many

Europeans. The exaggerated idea of their hairiness is, no doubt, due to the contrast between the smooth-skinned, hairless Japanese and Chinese and these people. As for the Ainu women, they are practically free from any abnormal growth of hair, and I have never seen amongst them any approach to the hirsute crop observable on the faces of many women of Southern Europe.

The Ainu people are fast diminishing, and although a project has been set on foot by influential Japanese and foreigners to take means to try and preserve the race from extinction, there is, I am afraid, but little hope of success. Their habits, their helplessness and want of spirit, and their passion for strong liquor, are against them; and, like all other savage peoples who come in contact with civilized ones, they are doomed to disappear.

The Ainu have no energy or ambition, and every bit of spirit, if they ever possessed any, has disappeared. Although to-day one sees but little, if any, actual tyranny on the part of their Japanese masters, yet there is sufficient circumstantial evidence to show that they have suffered harsh and cruel treatment. Practically leading the life of serfs, and taught to look upon themselves as altogether inferior beings to their Japanese conquerors, they have for hundreds of years been so cowed and crushed, that they have lost all idea of resistance or independence, and helplessness and submissiveness have become hereditary. Whatever the Ainu may have been ages ago, to-day they are the most docile, submissive, and spiritless people on the face of the earth. Strike an Ainu man, and the chances are he will burst into tears. I have seen this on more than one occasion, the chastisement being nothing more than a smart cuff with the open hand. In the Ainu there is a curious mixture of courage and timidity; they do not hesitate to attack a bear, but they have a mortal and instinctive fear of the Japanese. Witness their dread of offending the Japanese officials by giving information about themselves to Miss Bird, as recorded in her charming book, "Unbeaten Tracks in Japan." Even the northern Kurilsky Ainu, who were not subject to Japan, were terribly afraid of the Japanese, and I have known them hurriedly shift from one island to another on learning their approach.

This fear of their Japanese masters was much more apparent some twelve or fifteen years ago than it is to-day. It was probably as causeless then as it is now; but there is little doubt that this

apparently unreasonable fear is the result of cruelty and oppression in the past. The Japanese Government has of late years done considerable to help the Ainu, but unfortunately there is too little inclination on their part to help themselves.

With no written language, the Ainu have but little history of their own. With practically an absence of stirring traditions of their people to put and keep heart in them, with few or no doughty deeds of their forefathers to emulate, they have literally nothing to make them proud of their race. In other words, they have no patriotic spirit, and consequently nothing to encourage them to make an effort to continue to exist as a nation. Like the Blacks of Australia, their extinction is all but assured. It is a pity that such a sturdy and comely people, so much superior in physique to their Japanese rulers, should be effaced, but it cannot be avoided.

The Ainu are apparently a strong and healthy people, and one would think their numbers ought to increase ; but the opposite is the case. The reasons for this are several. Epidemic diseases, like smallpox for instance, when it once gets amongst them, plays sad havoc. Syphilis, introduced amongst them by the Japanese, and drink, play a not unimportant part in reducing their numbers. One other cause which tends largely to prevent the increase of this people is, in my opinion, the fact that, wherever the Ainu live in contact with Japanese, nearly all the young girls with any pretensions to good looks become the mistresses of Japanese. As such they often change their masters, and are not encouraged to bear children. After they have lost their freshness and are no longer attractive, they marry an Ainu husband, and the children of such marriages, as may be supposed, are limited in number. So far as my observation extends, an Ainu girl prefers to become the mistress of a Japanese rather than the wife of one of her own people. A Japanese, as a rule, can house, feed, and clothe her better, besides providing her with many little luxuries which with an Ainu husband it would be impossible for her to obtain.

Large families are very rare amongst the Ainu. Intermarriage between Japanese men and Ainu women is common, but I have never known of a Japanese woman marrying an Ainu man.

The offspring of Japanese and Ainu marriages are not long-lived. It is said they usually die out in the second generation.

This is probably true, for there is little, if any, trace of Ainu blood in the northern Japanese.

During my stay on Yetorup in 1875, I was told by the Japanese doctor of the place that when the Japanese first came to the island, about a hundred years before, there were some fifteen hundred Ainu there. They were a fine, strong, healthy lot of people, living chiefly on bears, seals, sea-lions, sea-otters, and fish, the roots of several wild plants, berries, and sea-birds and their eggs, a plentiful supply of all these being easily obtained in their due seasons. From the advent of the Japanese their numbers gradually decreased, until at that time (1875) there were less than 450.

The doctor also informed me that about seventy years previously (1805), two Hitotsubashi Yakunin (Japanese officials) were sent to Yetorup to take up their quarters. These were the first officials to reside on the island. The first lived at Oito, but later on at Shana, further up on the north-west coast, where a sort of fort or castle was built.

Forty years after this there was strife amongst the Ainu of the island, the northern natives fighting with the southerners, about some presents which had to be sent every year to the Ainu chief in Yezo. As recently as 1859 there were, according to his account, 1200 natives on Yetorup.

The Japanese appear to have established themselves on the island without opposition from the Ainu.

This account of the doctor's, in some respects, agrees with that given in Mr. W. G. Aston's paper, published in vol. i. of the *Transactions of the Asiatic Society of Japan*, entitled "Russian Descents in Saghalin and Itorup in 1806 and 1807," where I find, "At this time (1807) the Japanese colony (on Yetorup) was in a tolerably flourishing condition. It had been established more than ten years before, and had then a population of more than 1000 Ainu and 300 to 350 Japanese, including five women; most of the Japanese were, however, soldiers garrisoned at Shana."

The reason of the Russian descents was to coerce the Japanese Government into agreeing to a commercial treaty with Russia, the Tycoons Government having persistently refused all friendly overtures to that end, and ordered the Russian ships bearing a letter from the Czar to the Tycoon on this subject to quit the harbour of Nagasaki. This, together with the imprisoning of fourteen

Russians, "who had landed on Yetorup in hopes of being allowed to trade," * so irritated the Russians, that reprisals, taking the form of raids upon Yetorup and Saghalin, were entered upon.

In one of these raids the castle of Shana was captured and burnt, the stores and treasures carried away, and also some prisoners. The two Russian ships were under the command of Lieut. Chivostoff. The Japanese garrison made little or no resistance, and fled into the hills, where the officer in command committed *hara-kiri* to wipe out his disgrace.

The islands to the north-east of Yetorup, when under Russian rule, were more or less peopled with Ainu tribes, with whom were mixed a few Aleuts and natives of Southern Kamchatka.

In 1878, when I first visited these northern members of the Kuril chain, I found natives living on Urup, Ushishir, Rashau, and Shumshir. Previous to that time several more of the islands were inhabited. There are old villages containing from ten to thirty dwellings on Simushir, Matau, Kharimkotan, Shiashkotan, Onekotan, and Paramushir. Besides these, there are the remains of a few pit dwellings or *yurts* on Ketoi, Ekarma, and Alaid; these, however, were probably only used by hunting-parties from the larger settlements, and were not permanently occupied.

When the exchange of these islands for Southern Saghalin took place, those natives who wished to remain Russian subjects were removed to Russian territory; those who elected to remain on the islands in their old homes became subject to Japan.

All these northern natives, besides their own language—an Ainu dialect said to be similar to that of the Saghalin Ainu—spoke Russian more or less fluently. All were professedly Christians belonging to the Greek Church. Russian priests now and then visited them, and on Shumshir, at the village of Mairuppo, there was a church built of pine boards brought from America. At this village there was, in 1878, a substantial storehouse built of wood.

* On one of my northern cruises, I fell in with a native of the island of Urup who spoke English fairly well. He had made a voyage to San Francisco in a trading vessel which happened to visit his island on one occasion. He told me, amongst other things, that many years before the Urup nations used to make trips across to Yetorup to hunt sea-otters, which were very numerous there. These expeditions were objected to by the Yetorup people, and occasional fights took place. Some of the Urup natives were captured and held prisoners. These probably were the "fourteen Russians who landed in hopes of being allowed to trade."

It contained several rooms, and was heated by a Russian brick oven built in the middle of the house. There was an upper storey with a verandah in front, on which a flagstaff was set up. This was evidently the official residence in the prosperous days of the place.

The most important settlements on the northern Kurils were at Port Tavano, Urup; Uratman, in Broughton Bay, Simushir; and the above-mentioned Mairuppo, on Shumshir. At each of these, besides the score or so of half-underground dwellings, there was a church and a substantial wooden building, used as a store and residence by the agents of the fur company in former years. Nearly all traces of these wooden buildings have now disappeared, and a visitor to day would never imagine that such had once existed.

For some years previous to 1878, the northern natives depended for their scanty supply of luxuries and necessaries, such as guns, powder, lead, caps, tobacco, knives, etc., on the yearly visit of a trading vessel, which touched at certain of the islands during the summer, and traded for the skins of the sea-otters and foxes captured during the winter. Those living on Shumshir, the nearest island to Kamchatka, would occasionally visit Petropaulovski, making the voyage, a distance of about 170 miles, in their boats during the fine summer weather. There they could supply their wants by bartering away their peltries.

From 1878, when the northern islands began to be visited by otter-hunting craft, the natives fared somewhat better. From these vessels they were able to procure many little luxuries unattainable by them before—rifles, cartridges, tobacco, biscuit, tea, coffee, sugar, clothes, etc., and even soap. The women always begged for the latter, but I must say I never saw it used.

Some of these northern Kurilsky were similar in appearance to the Ainu of Yetorup and Yezo, but not so good looking; others were evidently of mixed blood, probably with Kamchatdales and Aleuts. They were less hairy, had smaller eyes, and the open lips and "blubbery" appearance of some of the Kamchatkan tribes.

Besides their uncleanliness, their fondness for strong drink, and their language, they had few things in common with their brethren of the south. I never saw amongst these people the carved wooden knife-sheaths and household utensils, and the peculiar salmon spear or gaff, as used by the southern Ainu; nor did I ever witness any

bear-feasts or dances, or the custom of raising the moustache with a stick when drinking, so universal in the south.

The dwellings of these people were constructed by hollowing out a shallow pit, usually in a sandy soil, planting posts around it, and, if they could be got, making an inside lining of boards. Poles were laid across the top, forming a flat roof, and more poles again laid at an angle from the edge of the roof, so as to give the sides a sharp slope. The whole was then covered with reeds or grass, on which was placed earth and turf. The entrance was closed by a roughly made wooden door, which opened into a small lobby and low narrow passage, with another door opening into the main compartment. Around the sides of this bunk-like recesses were constructed under the lean-to side walls. These were thickly strewn with dried grass, and used as sleeping-places.

Sometimes these dwellings consisted of two or three rooms, each one being separated by a short, low, narrow passage, with a door at each end. These larger houses are found more particularly on Shumshir, where the natives were much better off than those of the central Kurils. In the house of the chief man on Shumshir, which was one of three rooms, I saw plates, cups, and saucers, and was invited to take some tea—an almost unheard-of luxury with the natives of Ushishir and Rashau, etc. Rough tables, seats, and shelves were fitted up inside the better houses, and each one had a kind of small altar, on which was placed a brilliantly coloured picture of our Lord and the Virgin Mary, and in some a picture of the Czar.

Their worldly possessions were very limited; some pots and pans, a few tools, a knife or two, an old muzzle-loading rifle, and a few odds and ends, completed their outfit. Some of them had dogs, and there were usually at each settlement a couple or more boats, which appeared to be common property. Even amongst these poor people there were different grades, certain families taking precedence of others.

The food of these people consisted of the flesh of the seal, sea-lion, sea-otter, sea-fowl and their eggs, berries, a few roots, and fish. They did not, however, appear to be large eaters of the last named. Food was plentiful during the summer, but, being improvident and very lazy, they were often hard pushed during the winter and spring, sometimes having to subsist on the few limpets and mussels they could gather around the rocks on the beach. This usually

happened when the weather was too cold and boisterous to get about, or when they had used up all their ammunition.

The flesh of the sea-otter, which is very rank to a civilized palate, was their favourite food. The intestines of the animal, put into a saucepan just as they were taken from the carcase, without any attempt at cleaning, and stewed, was considered a great delicacy.

Like all the rest of the northern tribes, they were extremely fond of spirits. I have, however, met a few who would not drink. On Saghalin I have seen a native Ainu woman give her baby at the breast neat rum, which the little one appeared to enjoy, for it cried for more, and would not be quieted till it got it.

The dresses of these natives were made of birdskins, sewn together with sinews of the sea-lion. The feathers were worn inside next the skin. The outside of the dress was usually adorned with the yellow plumes and brilliantly coloured beaks of the tufted and horned puffin. The edges, and around the neck, were trimmed with narrow strips of fur sealskin. In shape the *parka* was like a large shirt. It was put on over the head, and had an opening halfway down the front. At the neck it was fastened by strings, on the ends of which were ornaments made of puffins' beaks and a small piece of fur. A girdle of sea-lion hide was used by the men to tie in at the waist. The women generally wore theirs loose, and it was made longer than the men's, because, I suppose, they did not wear trousers as a rule.

The overhanging fold above the girdle was used instead of a pocket. It was a receptacle for everything. In bringing off skins to trade, they would invariably be stowed away inside their *parka*, and produced one at a time, and when the bartering power of that one skin was exhausted, another would be produced, and so on. Everything got in exchange, that would go inside this garment, was put there, and it was common to see tins of powder, boxes of caps, pieces of lead, tobacco, tea, sugar, cooked rice, beef and pork, old shirts and trousers, etc., all stowed away, indiscriminately mixed up, around a man's waist. Sometimes they would bring off seafowls' eggs, and not a few would get broken. The state of things inside their *parka* can be imagined.

For lower garments they wore trousers made of birdskins also, when they could not obtain any old cloth ones in trade. Trousers

and shirts were much in demand; but coats, waistcoats, hats, and boots were comparatively useless to them.

A cap of sealskin, and mocassins reaching to the knee, the uppers made of sea-lion or seal hide, and the feet of the rubber-like skin of sea-lion flippers, completed their outfit. One or two of the Shumshir natives possessed a suit of foreign clothes and a Russian peaked cap.

The boats used by these Kurilsky Ainu were peculiar to themselves. They were most ingeniously constructed, and, considering the poor tools, the materials of which they were built, and the way in which they were put together, were good serviceable craft. Some of them were about 30 feet long, 5½ feet broad, and about 4 feet deep.

They were built with considerable shear. The stem and stern posts were made of a thick plank bent into a rounded form, extending from the keel plank, and carried up about a foot and a half above the level of the gunwale, the ends or heads being shaped into a spear-head form. Inside, the boat was strengthened by frames and knees. The broad planks outside were placed edge to edge, shaped to coincide with the shear, and made to meet as neatly as their rough tools would allow. Over the seams half-round battens, about an inch wide, were placed, and kept in position by lashings of whale sinews or whalebone fibres, which passed through small holes made in the planks just above and below the batten. These lashings were continued all along the seams at intervals of about 6 or 8 inches. Each one was finished off separately, not carried on from one to another, the sinews being passed round and round over the battens and through the holes. The holes were then tightly plugged with wooden pegs, and the seams inside calked with moss. In the same manner lashings were passed through holes in the planks round the timbers and knees. The gunwale, thwarts, strengthening pieces, etc., were all fastened in this way, and so a good serviceable though rough boat was constructed without a nail or a piece of metal of any kind being used in it. Short oars, worked on pins or in grommets of sea-lion hide, were used to propel the boat. A mast and an old sail, probably got out of some wreck, completed the outfit.

Previous to the removal of those Kurilsky who choose to

remain Russians after the exchange of territory, these natives possessed skin-covered *bidarkis*, such as are used by the Aleuts. All these, however, seem to have disappeared with the Russian contingent.

The Kurilsky inhabiting the central islands frequently shifted their quarters from one island to another. When this "flitting" took place, it was a matter of serious consideration. The weather had to be watched very closely, both for storms and fogs. Should the latter set in when they were at sea, there was great risk of them not being able to find their destination, as they possessed no compass, and the currents were strong and uncertain. On these voyages the women and youths did most of the rowing, whilst an old chief captained each boat, steering with an oar.

The natives who remained on the northern Kurils after they became Japanese territory, continued to reside in their old settlements for several years, and then, much to their sorrow, were removed by order of the Japanese Government to the island of Shikotan.

Their dogs were all killed, and their boats left behind. They were located at Shakotan, a small bay on the north side of the island. Here a village was laid out and built; they were made to work, and encouraged to cultivate plots of land. Some cattle and sheep also, which they had to attend to, were placed on the island. They were allowed so much rice, and a doctor and teacher were provided for them.

Notwithstanding this change—for the better, one would think—they were very unhappy, and pined for their northern home with all its dirt and discomforts. The change from an almost wholly animal diet to one of rice and a few vegetables and fish did not suit them, and many died the first year.

The Japanese officials placed over them were very arbitrary, and the poor creatures were in great fear of them. They told me they dare not leave the settlement, go out in a boat, kill a seal, or do anything out of their ordinary routine, without first obtaining permission from the official.

The last time I saw any of these natives was in 1889. I was lying in Anama Bay, some 6 miles or so from their village. One of them, hearing that my vessel was there, secretly left the settlement, made his way over the hills to where we lay, and came on

board. He had learned to speak Japanese fairly well, and could also speak a little English. He told me his woes, and how they all longed to get back to their former homes. He finished his story, in the most plaintive voice imaginable, in these words: "Shikotan, no good; Ushishir *dobrey* (good), sea-lion plē-ē-nty, sea-otter plē-ē-nty, fur-seal plē-ē-nty, bird plē-ē-nty; Shikotan nō-ō got, Shikotan nō-ō got."

After he had been on board some time, a boat, manned by several men, was noticed pulling into the bay. He recognized them, and said they were coming to look for him, and asked to be hidden until they went away; so he was sent into the forecastle. Those in the boat came on board, and, after a short stay, left without finding or inquiring for our Kurilsky friend.

After their departure we landed our visitor, making him happy with a present of tobacco and a few trifles.

The Kurilsky Ainu on Shikotan, in October, 1891, numbered but fifty-nine men, women, and children. They were visited at that time by a Russian missionary priest from Japan.

Amongst the Kurilsky, judging from appearances, there were few, if any, of pure Ainu blood; they were a mixture of Ainu, Kamchatdales, and Aleuts, these last having been taken to the Kurils in the days of the old Russian American Company.

The pure Ainu do not extend beyond Yetorup.

The Ainu race has been considered by some ethnologists to have had a northern origin, and that this people penetrated to Jezo and Japan, advancing southwards and westwards, until they were met and turned back by the Japanese advancing from the opposite direction.

The researches of Basil Hall Chamberlain, Professor of Japanese and Philology in the Imperial University, amongst old Japanese writings, and his study and explanation of many of the place-names of the country, prove beyond a doubt that the Ainu once inhabited Central and Western Japan, and may have had a more extended southern range.

There is little or nothing to lead one to assume a northern origin for the Ainu; indeed, there is a certain amount of negative evidence which, I think, tends to show that they were not a northern race. The Ainu has no marked characteristics, customs, utensils, weapons, boats, etc., peculiar to most, if not all, primitive

races inhabiting a rigorous climate; as, for instance, a fondness for raw food, oil and blubber, the use of dog-sledges, snow-shoes,* boats and canoes made of skins, ornaments and weapons made of walrus ivory, the almost universal use of skins and furs for clothing, and houses constructed to keep out cold.

The Ainu always cooks his food. Although a great flesh-eater, he is not fond of oil or blubber. Although he has dogs, and Yezo and Yetorup during the winter are suitable, he does not make use of dog-sleighs. He uses, or used, bamboo to tip his weapons, and he does not possess ornaments or weapons or charms made of walrus or mammoth ivory, some few of which would surely have been preserved and handed down had his race originally come from the north. His clothing is chiefly made of a coarse cloth woven from the bark of a tree. His house is such as would naturally be used in a warm or mild climate; it is not even adapted to the climate of Yezo, to say nothing of regions further north.

The Ainu say that Yezo was formerly inhabited by a people whom they call *Koro-pok-guru* † (dwellers in holes), and whom they say they destroyed. They also speak of these ancient inhabitants as *Koshito* (small people), because, they say, they were a very diminutive race.

It is possible that the Ainu belief, that the Koro-pok-guru were a diminutive people, is a comparatively modern one.

The inside of the dwellings of the Koro-pok-guru are very low, and the entrance door and lobby passage still lower, being only about 4½ feet high, so that an ordinary man has to stoop considerably on entering. It is quite conceivable that the Ainu

* The Ainu of Yetorup do use snow-shoes, but they are unlike anything to be found in the north, and of very little use. They are oval in shape, and both shoes are alike. They are from 24 to 30 inches long and about 8 inches wide, made of two pieces of wood about an inch wide, bent round into the form of a long U. The open ends are overlapped and lashed together. The shoe is fastened to the foot by a thong of sea-lion skin, which is passed two or three times across the shoe at a distance of about one-third of its length from the fore end, which has a slight upward bend. The ball of the foot rests on the crossed thong, the ends of which are brought over the instep and passed in opposite directions around the heel and beneath the ankle-bones to the front, where they are fastened off. The shoe is not netted, and the only bearing surface is the foot and the narrow rim of the shoe.

† Prof. John Milne, F.R.S., has published some "Notes on the Koro-pok-guru, or Pit-dwellers of Yezo and the Kuriles," in vol. x. of the *Trans. of the Asiatic Society of Japan.*

should imagine that such dwellings should only be used by a people of very short stature.

The Koro-pok-guru were undoubtedly a northern race, which penetrated to Yezo *viâ* the Kuril Islands. They probably were never very numerous, and the Ainu, when they were driven by the Japanese into Yezo, would have had no difficulty in exterminating or driving these people back whence they originally came. Their *yurts*, or pit-dwellings, are found all along the Kurils, in Saghalin, in Kamchatka, and on the Aleutian Islands. The Koro-pok-guru kept to the same style of dwelling they used in the far north, even when they pushed their way into a much milder climate.

The Ainu, following their old custom, still built their style of house when they got into the more rigorous climate of Yezo and the Kurils, notwithstanding it is suitable only for a warm or mild climate. So strongly, apparently, is the habit or custom of keeping to the old style of house imbued in a people, that the Japanese even do not alter their dwellings to suit the climate, but build the same kind of house, with sliding doors and paper *shoji*, in the cold Kurils and Yezo that they do in the warm south.

IV.

FAUNA AND FLORA.

MAMMALS.—The mammalia of the Kuril Islands are few. Those found on Yetorup and Kunashir are identical with those of Yezo, and those found on Paramushir and Shumshir are the same as those of Kamchatka.

The following is a list (probably incomplete) of the mammals of the islands.

Bears.—*Ursus ferox* (?), Yezo bear.
„ *arctos*, var. black bear.
„ *arctos*, var. brown bear.

Wallace, in his "Island Life," calls the Yezo bear *U. arctos*. Siebold, in his "Fauna Japonica," gives it as *U. ferox*, and he is followed in this by Professor Rein. Probably neither is correct. *U. arctos* is found on Shumshir and Paramushir. There are two varieties, which the Kamchatkan natives distinguish by calling one the black and the other the brown bear. They both attain a large size, but there appears to be a considerable difference in the shape of the skulls and in the teeth of the two varieties.

The Japanese claim to have *white* bears in the northern part of their country, and both Siebold and Rein give *U. maritimus* in their lists. The polar bear, however, never gets to these parts; it is simply impossible for it to do so. No Arctic, or Bering Sea ice even, ever gets to the Kuril Islands. The ice that reaches Yezo and these islands is formed in the northern and north-western parts of the Sea of Okotsk, where there are no polar bears. The Yetorup natives told the writer that they sometimes obtained a *white* bear; but on closer inquiry he found that what they called a *white* bear was the *Yezo bear* with a *very light drab-coloured coat*, which some of them appear to get at a certain age or season.

Wolf.—*Canis hodophylax* (?). Found on Kunashir and Yetorup. It is rarely seen.

Foxes.—(Red) *Vulpes fulvus.*

(Black) „ „ var. *argentatus.*

(Cross) „ „ var. *decussatus.*

(Yezo) „ „ ?

Foxes are plentiful on most of the islands. The only places without them are Shirinki I., Ekarma I., Chirinkotan I., Raikoke I., Ushishir I., Makanruru I., and the Black Brothers Is. The foxes on the central Kurils are said to have been placed thereon by the natives, who brought them from the north. The winter skins of these animals are remarkably fine, and there is a large proportion of cross and silver grey amongst them. The foxes of Kunashir and Yetorup, and probably also of Urup, are the same as those of Yezo. The red variety predominates, but occasionally cross and grey ones are met with; the skins, however, are not so fine as those of the central islands.

Land-otter.—*Lutronectes whiteleyi.* Fairly common on Kunashir and Yetorup. It may, perhaps, also exist on Urup, but has not been seen by the writer.

Martin.—*Mustela brachyura.*

Japanese sable, *Mustela melampus.*

Found on Kunashir and Yetorup only. There are probably also some other members of the Martin tribe.

Rodents.—Hare, *Lepus* (?). Found on Kunashir and Yetorup. It turns white in winter.

Squirrels.—On the southern islands only.

Rat.—On southern islands only.

Lemming.—On Paramushir, Onekotan, and Shumshir the ground in places is honeycombed by these small animals.

MARINE MAMMALS.—

Sea-otter.—*Enhydra marina.* Found all along the Kuril chain.

Fur Seal.—*Otaria ursina.* Numbers are seen off the coasts, but the three "rookeries" of Srednoi, Kaikoke, and Mushir are now all but deserted.

Sea-lion.—*Otaria stelleri.* Exists in large numbers. There

are eighteen breeding rookeries on the islands, where probably a hundred thousand of these animals "haul up" during the summer.

Black Sea-lion (?).—*Otaria gillespii* (?). The writer noticed what he considered to be this species on Urup and the Black Brothers. They were in limited numbers, and were hauled up amongst the *O. stelleri*. They were distinguishable by their smaller size, differently shaped head, and their "*honk, honk*" bark. It is possible, however, they may belong to the Australian species, which is said to reach Japan.

Hair Seal.—Phoca vitulina. Common on all the islands.

Cetacea.—Right Whale, *Balœna japonica.* Found off shore, but does not frequent the coasts and bays.

Humpback whale, *Megaptera versabilis.*

Sulphur-bottom whale, *Seebaldius sulphureus.*

Fin-back whale.

Grey-back whale, *Rachianectes glaucus.*

All common, particularly about the coasts of the southern islands.

Delphinidœ.—Black fish, *Globiocephalus scammonii.* Killer whales, *Orca* (?).

Probably two species. They are usually seen in "schools" of about a dozen. The species with the very high dorsal fin (6 to 8 feet), with a broad base, is the most common.

The writer witnessed an attack made by a school of killers on a large humpback whale and her "calf." In order to protect the "calf," the "cow" whale kept it on her back,swimming so that the young one was only about two-thirds submerged. When the whale was last seen she appeared to be almost exhausted, barely moving through the water. The whale appeared to make no defence.

Porpoise.—Delphinus (?)

„ (?)

„ (?)

There are at least three kinds of these animals, which are fairly plentiful, more particularly in the vicinity of the southern islands. The "puffing pig" is common along the whole chain.

The writer has never seen the walrus (*Rosmarus obesus*) about the Kurils, or even south of Avatcha Bay, on the Kamchatka coast. A stray one, however, was taken some years ago near Hakodate, in Tsugaru Strait, which must have passed along the Kurils from the

north. There are no suitable feeding-grounds for this animal on the Kuril Islands.

Occasionally the small grey seal (*floe rat*), which frequents the north-western part of the Okhotsk, gets down to the Kurils on the ice-floes, but it does not remain.

AVIFAUNA.—Bird life on the Kuril Islands is represented by about a hundred and sixty or a hundred and seventy species, the greater proportion of which is found on the southern islands, Kunashir and Yetorup, both of which are well wooded, and in close proximity to Yezo. The islands to the northward of Urup, being without trees, have very few land-birds. Amongst those to be found, wagtails and flycatchers are the most common. Ravens and peregrine falcons are seen on nearly every island, and eagles are to be found on most. The willow grouse, which is very plentiful on Kamchatka, has been noticed as far down the chain as Ekarma.

The Kuril Islands are used but to a very limited extent as a migratory route. Long-tailed ducks, and divers in considerable numbers, however, are to be seen in early spring, making their way to their northern breeding-grounds along this route. A few swans, geese, and ducks, and a limited number of the *Limicolæ* also pass along this way, together with a very few land-birds.

The vast majority of the birds which migrate to the more northern regions in spring take the Saghalin route, which is over a wooded country, with numerous swamps, lagoons, and lakes.

Probably three-fourths of the birds which are to be found on the islands in summer leave as winter approaches.

The following is a list of the birds frequenting the Kurils. It is probably most complete as regards the sea-fowl.

The numbers refer to Blakiston and Pryer's "Catalogue of the Birds of Japan," published in the *Transactions of the Asiatic Society of Japan* in 1882. The birds with no numbers against them are not in B. and P.'s list.

(1) *Mormon cirrhatum*, tufted puffin. Very plentiful all along the Kurils in summer. This bird begins to arrive at the islands about first week in May. Commences laying about June 15. Lays one egg, white, with very faint markings. Nests in holes, burrowed out of the soft ground on the tops of cliffs and islets. Leaves the islands soon after the middle of September.

(2) *Mormon corniculatum*, horned puffin. Usually found in

pairs; seldom seen south of the Black Brothers. Though not uncommon on the central and northern islands, they are nowhere numerous. The egg is like that of the tufted puffin, and its habits are similar.

(4) *Phaleris cristatella*, crested auk.

(5) *Phaleris mystacea*, whiskered auk. Large numbers of both these auks on all the islands to the northward of Urup. They arrive towards the end of April. Lay one pure white egg, beneath boulders and coarse shingle, and in crevices of the rocks and cliffs, preferring situations not much above high-water line. They commence to lay about the middle of June.

(5½) *Phaleris psittacula*, parrot auk. Found on the central and northern islands, generally in pairs.

(6) *Phaleris pusilla*, least auk. This bird I have some doubts about, and think the specimens attributed to this species are immature *P. mystacea*.

(8) *Brachyrhamphus antiquus*, grey-headed auk. Found all along the Kurils; always seen in small flocks of eight or nine.

(9) *Brachyrhamphus kittlitzi*, Kittlitz guillemot.

(10) *Uria carbo*, sooty guillemot.

(10½) *Uria columba*, pigeon guillemot. This bird is very common on all the islands. Lays one speckled egg under rocks and boulders on the beaches, about the middle of June.

(*) *Uria marmorata*, marbled guillemot. Is not common. A very shy bird, and somewhat difficult to obtain, as it usually dives at the flash of a gun, and will, if wounded, remain under water and die there.

(11) *Uria troilé*, common guillemot.

(12) *Uria brünnichi*, Brunnich's guillemot. Plentiful all along the islands. These birds arrive about the end of April, and leave towards the end of September. About June 8 they commence to lay, but their eggs are not plentiful until the middle of the month. The single egg is laid on the bare ledges of cliffs and rocks. The eggs are pyriform in shape, and exceedingly fancifully coloured, the grounds being green, blue, yellow, white, grey, etc., with brown and black specks and blotches. No two eggs appear to be alike. They are particularly good eating, the flavour being not unlike the eggs of the plover.

Mr. Elliot, in his "Ornithological Notes of the Pribilov Islands,"

in describing this bird, says that "they feed entirely upon marine crustacea," that he never "found fish in their craws," and that "the young are fed by the disgorging parents." My observations do not confirm these remarks. I have often seen them capture small fish about 2 inches in length, and fly away with them in their bills to their young.

Once while gathering eggs on Avos rock, I found, laid beside each egg that was just on the point of being hatched out, one of these small fish, evidently placed there in readiness for the young chick.

(13) *Fratercula monocerata,* horned-bill guillemot. Found about Shikotan and the small islands off the east coast of Yezo, where it breeds in large numbers. I have not noticed this bird even so far north as Yetorup.

(15) (?) *Podiceps* (?), grebes. A few of these birds have been noticed on the lagoons and ponds of the islands, but the species was not ascertained.

(18) *Colymbus arcticus,* black-throated diver.

(19) *Colymbus septemtrionalis,* red-throated diver. Very common in early spring, when numbers are to be seen making their way northwards along the islands. A few breed on Paramushir and Shumshir.

(18½) *Colymbus adamsi,* great white-billed diver. A few seen.

(20) *Cygnus musicus,* hooper swan. A few frequent the islands. Noticed on Yetorup in winter.

(22) *Anser sagetum serrirostris,* bean goose.

(24) „ *albifrons,* white-fronted goose.

(25) „ *minutus,* lesser-fronted goose.

(26) „ *cygnoides,* Chinese goose.

(28) „ *hutchinsi,* Hutchins' goose.

(29) „ *nigricans,* Brent goose.

All these geese are to be found as visitors either to the northern or southern islands, but they are never seen in large numbers. A few *A. hutchinsi* have been noticed breeding on Ushishir and Ekarma. A nest with six eggs and another with seven were found on the 16th of May. Young ones were found on the 20th of June.

(30) *Anas boschas,* mallard duck.

(31) „ *zonorhyncha,* dusky mallard duck.

(35) *Anas penelope*, widgeon.
(36) „ *acuta*, pintail duck.
(37) „ *crecca*, teal.
(39) „ *falcata*, falcated teal.
(42) „ *strepera*, gadwall duck.
(43) *Fuligula marila*, scaup duck.
(45) *Fuligula cristata*, tufted duck. On the Southern Kurils and Shikotan.

(48) *Fuligula histrionica*, harlequin duck. Abundant along all the Kurils, where it breeds. The writer has not been able to find the eggs, but in June, 1888, captured a female with several young ones, which were but a day or two old. In August these ducks assemble in flocks of many hundreds. They are fond of basking on the rocks along the shore. When inland up the streams they are nearly always seen in pairs, but when on the sea they are invariably found in flocks.

(50) *Fuligula glacialis*, long-tailed duck. This duck is very plentiful in early spring, when it is found to be making its way northwards to its breeding-grounds in the Arctic. An occasional straggler gets left behind, and is seen on the islands in the summer.

(52) *Fuligata fusca*, velvet scoter.
(53) *Fuligata americana*, American scoter. A few breed on the northern islands.
(51) *Somateria stelleri*, Steller's western duck. Occasionally found on the islands during winter.
Somateria v-nigra (?), Pacific eider. A few of these have been seen about the most northern islands in early spring.
(55) *Mergus castor*, goosander.
(56) *Mergus serrator*, merganser. Both these breed on the Kurils. Obtained on Yetorup in winter.
(58) *Phalacrocorax pelagicus*, resplendent shag.
(59) *Phalacrocorax bicristatus*, barefaced shag.
Phalacrocorax (?), shag.

The shags are the first sea-birds to commence laying. Eggs obtained on the 15th of May. They are very small for the size of the bird, of a long oval shape, chalky white, with a slight bluish tinge. Five or six is the usual number laid. Some of the shags remain about the islands throughout the winter, but the

greater number go south. They are abundant all along the islands.

(63) *Sterna longipennis*, tern.

Sterna (?), tern.

Two or three species. They are rare during the summer, but not uncommon in early spring.

(66) *Larus glaucus*, burgomaster gull. Common on all the islands. It is the next sea-bird to the shag to commence laying. The writer has taken the eggs on the 23rd of May. By the first week in June nearly all the nests contain three eggs, which is the usual number laid. The egg is very palatable when the bird is not feeding on strong food, like seal-meat. If, however, the burgomaster feeds on the carcases of seals, etc., the yolks become dark and the egg slightly strong. So long as the yolks of the eggs remain light in colour, they are as good as the egg of the domestic duck.

During the breeding-season these gulls become veritable birds of prey. All around their nests may be found the bones and wings of scores of auks. As soon as a burgomaster discovers a little auk unable to rise from the water through being too young, or through its feathers having got partly water-soaked, it pursues it until the little fellow is exhausted with diving, when it captures it, and flies off with it in its beak. Numbers of these gulls will accompany a boat when pulling round the islands or rocks, and when the guillemots are frightened off their eggs, the burgomasters will make raids and steal them, carrying them off in their beaks.

(68½) *Larus cachinnans*, Arctic herring gull.

(69) „ *canus*, common gull.

(70) „ *marinus*, great black-backed gull.

(73) „ *ridibundus*, black-headed gull.

(74) „ *tridactylus*, kittiwake gull.

Of these gulls the kittiwake is the most plentiful; colonies of them are to be found on almost every island. About June 10 the birds begin to lay. The nest is placed on ledges on the faces of the cliffs. Eggs usually three. They are very good eating.

The other gulls, though not uncommon, are not numerous.

(74½) *Stercorarius buffoni*, Buffon's skua.

(75) „ *richardsoni*, Richardson's skua.

(75¼) „ *pomatorhinus*, pomarine skua.

Not uncommon; a few probably breed on the islands, for the writer shot a specimen with fully developed egg inside.

(76) *Diomedea derogata*, flesh-billed black albatross.

(77) „ *brachyura*, Steller's albatross.

(78) „ *nigripes*, Andobin's albatross.

All these are common throughout the summer, but they do not breed on the islands.

(79) *Fulmarus pacificus*, Pacific fulmar. This bird, which is of a dark slate colour all over, is found in large numbers all along the Kurils, but more particularly about the central islands. It builds no nest, but lays its one white egg on the grassy tufts and ledges of the cliffs. The egg is probably the best of all the sea-fowls', and is equal to that of the domestic fowl in flavour. Professor Elliott describes the fulmar of the Pribilov Islands (*F. glacialis Edgersi*) as one of the *earliest* laying birds. The fulmar of the Kurils is one of the *latest* laying birds, the first eggs being found about June 15. They are not plentiful until a week later. Gathering the eggs of this bird is not altogether a pleasant operation. The fulmar has literally to be knocked off her egg, and when climbing the cliffs for them—generally about the time one's head is on a level with the setting bird—she will invariably eject, to a distance of one or two feet, a strong-smelling, pungent, oily liquid, which bespatters one's clothes and face, often getting into the eyes and causing considerable smarting.

Fulmaris glacialis rodgersi, fulmar. This fulmar, which is so common in the Bering Sea, is comparatively rare on the Kurils. A few are to be met with about the central and northern islands.

(80) *Procellaria leucorrhoa*, Leach's petrel.

(81) „ *furcata*, grey petrel.

Both these petrels breed on the Kurils. They lay one pure milk-white egg about the middle of June. They make no nest, but deposit their egg beneath boulders and in crevices of the rocks and cliffs, in company with the auks and pigeon guillemots.

(81½) *Puffinus griseus*, sooty shearwater.

(83) „ *tenuirostris*, slender-billed shearwater.

The former is found about the southern islands, and the latter about the northern more particularly. There are probably other species also. Albatrosses and shearwaters, although common throughout the summer in these latitudes, do not breed here.

They probably visit some of the small islands in or near the tropics during the winter months for that purpose.

(84) *Charadrius fulvus*, Eastern golden plover.
(85) *Ægialitis cantiana*, Kentish plover.
(86) „ *placida*, sand-plover.
(87) „ *curonica*, little ringed plover.
(88) „ *mongolica*, Mongolian sand-plover.
(91) *Squatarola helvetica*, grey plover.
(92) *Strepsilas interpres*, turnstone.
(93) *Hematopus osculans*, oyster-catcher.
(94) *Totanus incanus*, grey sandpiper.
(95) „ *glottis*, greenshank.
(97) „ *fuscus*, redshank.
(98) „ *ochropus*, green sandpiper.
(99) „ *glareola*, wood sandpiper.
(100) *Tringoides hypoleucus*, common sandpiper.
(101) *Limosa lapponica*, bar-tailed godwit.
(102) „ *brevipes*, godwit.
(104) *Tringa crassirostris*, Eastern knot.
(105) „ *cinclus*, dunlin.
(108) „ *subminuta*, stint.
(110) *Calidris arenaria*, sanderling.
(112) *Phalaropus hyperboreus*, red-necked phalarope.
(113) „ *fulicarius*, grey phalarope.
(117) *Gallinago scolopacina*, common snipe.
(119) „ *gallinula*, jack snipe.
(116) „ *australis*, Australian snipe.

Some of these species no doubt breed on the islands, but in limited numbers.

(120) *Numenius lineatus*, curlew.
(123) „ *cyanopus australis*, Australian curlew.
(124) „ *variegatus*, whimbrel.

Both curlew and whimbrel feed largely on berries, which are very plentiful on the Kurils and Kamchatka. In September, 1891, the writer shot several which were full of berries. When thus feeding they are delicious eating. Gulls also are berry-eaters at this time. Geese and ptarmigan feed on berries to a considerable extent, and teal also I have found indulging in the luxury.

(134) *Herodias modesta*, great egret. Seen on Yetorup Island.

(?) *Tetrastes mutus*, common ptarmigan.

(156½) *Lagopus albus*, willow grouse. Found on the Northern Kurils.

(159) *Turtur gelastes*, Eastern turtle-dove. Only on the Southern Kurils.

(163) *Cuculus* (?) *canorus*, cuckoo. Observed on the Southern Kurils.

(167) *Picus major*, great spotted woodpecker.

(168) „ *minor*, lesser spotted woodpecker.

And probably others on the Southern Kurils only.

(182) *Hirundo* (?), swallow. Southern Kurils.

(186) *Cypselus pacificus*, white-rumped swift.

(187) *Chætura caudacuta*, needle-tailed swift.

Probably the sand-martin and also the black-chinned martin are to be found also.

(188) *Caprimulgus jotaka*, goatsucker.

(189) *Corvus japonensis*, Japan crow.

(190) „ *corone*, carrion crow.

(191) „ *corax*, raven.

C. Japonensis and *C. corone* on the southern islands only, but *C. corax* is to be found on every island in the chain, always in pairs. Breeds early, the young being found about the middle of June.

(197) *Nucifraga caryocatactes*, nutcracker. Found on Ketoi, where there is a small clump of pine trees, the only timber on any of the islands north of Urup. It probably also frequents the southern islands.

(203) *Sturnia pyrrhogenys*, red-cheeked starlet. Noticed on Yetorup.

(207) *Cyanoptila cyanomelana*, Japanese blue flycatcher.

(208) *Muscicapa latirostris*, brown flycatcher.

(208½) „ *siberica*, Siberian flycatcher; and probably several other species of flycatchers.

(216) *Parus palustris Japonicus*, marsh tit.

(218) „ *varius*, Japan tit; and probably *P. ater* and *P. minor*.

(220) *Acredula caudata*, long-tailed tit.

(222) *Sitta europæa uralensis*, nuthatch; and probably also *S. albifrons*.

(226) *Anthus japonicus*, Japan pipit.

(227) *Anthus cervinus*, red-throated pipit.
(229) *Motacilla japonica*, Japanese wagtail.
(229½) „ *lugens*, Kamchatkan wagtail.
(230) „ *boarula*, grey wagtail.
(230½) *Budytes flavus taivanus*, green wagtail.
(238) *Locustella ochotensis*, grasshopper warbler. Probably also *Phylloscopus borealis*, *P. xanthodryas*, *P. coronatus*, and some others.
(245) *Troglodytes fumigatus*, Japan wren.
(245½) „ „ *kurilensis*, Kuril Island wren.
(252) *Erithacus calliope*, Siberian ruby-throated robin.
(254) *Pratincola indica*, Indian stonechat.
(256) *Monticola solitaria*, rock thrush.
(266) *Alauda arvensis pekinensis*, Japan skylark.
(266½) „ *japonica*, small skylark.
(267) „ *alpestris*, shore lark.
This bird has not been collected, but in Yarrel's "British Birds" it is said to occur on the Kurils.
(268) *Emberiza ciopsis*, meadow bunting.
(269) „ *fucata*, painted bunting.
(271) „ *rustica*, rustic bunting.
(272) „ *personata*, masked bunting.
(273) „ *aureola*, yellow-breasted bunting.
(277) „ *yessoensis*, yesso bunting; and probably some others.
(281) *Passer* (?), sparrow.
(285) *Fringilla spinus*, siskin.
(288) *Leucosticte brunneinucha*, ground finch.
(289) *Uragus sanguinolentus*, long-tailed rose finch.
(291) *Pinicola enucleator*, pine grosbeak; and probably *Carpodacus roseus*, *Coccothraustes vulgaris*, and *C. personatus* on the southern islands.
(295) *Loxia albiventris*, Swinhoe's crossbill.
(296) *Pyrrhula orientalis*, Eastern bullfinch.
(296½) „ *rosacea*, rosy Oriental bullfinch.
(296¼) „ *griseiventris kurilensis*, Kuril Oriental bullfinch.
(299) *Syrnium uralense rufescens*, owl.
(300) *Asio accipitrinus*, short-eared owl.

(301) *Asio otus*, long-eared owl. Probably also *Scopo Japonicus*.

(306) *Aquila chrysaëtus*, golden eagle. The writer saw on Yetorup what he took to be this eagle, where he observed both the following :—

(307) *Haliaetus albicillus*, white-tailed eagle.

(308) „ *pelagicus*, northern sea-eagle.

(309) *Pandion haliaetus*, osprey.

(310) *Milvus melanotis*, black-eared kite.

(313) *Buteo japonicus*, Japan buzzard.

(318) *Accipiter nisus*, sparrow-hawk.

(321) *Hypotriorchis subbuteo*, hobby.

(322) „ *œsalon*, merlin.

(323) *Falco peregrinus*, peregrine falcon.

(324) *Circus cyaneus*, hen harrier.

Of the *Accipitres* the Peregrine falcon is the most common. It is found throughout the whole chain of islands. The others mostly frequent the southern islands. There are probably more members of this group than are mentioned in this list.

Reptiles.—The writer is under the impression he has seen a small lizard in Yetorup, but he has not noticed reptiles elsewhere on the Kurils, though snakes and frogs probably exist on Kunashir, they being common in the neighbouring land of Yezo.

Fishes.—Compared with other localities, the waters of the Kuril Islands do not contain a great many different species of fish. In the vicinity of the southern islands, fish are most plentiful. At certain seasons the waters teem with fish of the herring family, whilst cod, halibut, and several kinds of rock-fish are to be found all the year round. Several species of Salmonidæ are very plentiful also, vast numbers being taken both in Kunashir and Yetroup.

The waters about the northernmost islands are well stocked with cod, halibut, rock-fish, etc. Cod are much more plentiful there than in the neighbourhood of the southern islands, and some of the banks lying off to the north-west of Alaid are frequented by cod-fishers from San Francisco.

The streams of the northern islands are smaller and not so suitable for salmon as those of the southern islands. The "run" of the fish is also shorter, and consequently they are not so plentiful as on the southern members of the chain. A few miles

away, however, on the Kamchatkan coast, these fish are found in much vaster numbers even than on Yetorup.

The Central Kurils are practically without fish. Between Urup and Kharimkotan hardly a fish is to be caught or seen. The water around these central islands is mostly very deep, and the bottom either of rock boulders or clean sand, on which there is little or nothing for fish to feed.

The following is a list of the fishes noticed by the writer :—

Fresh-water Fishes.—

King salmon, *Oncorhynchus tchawytcha* or *orientalis* (?). Observed on Yetorup only.

Salmon, *Oncorhynchus Haberi Pall.*

Salmon trout, „ *Blakistoni.*

„ *Perryi.*

„ *Jessoensis*, and some other species, on the southern islands.

Hump-backed salmon, *Oncorhynchus proteus.*

Oncorhynchus lagocephalus, and some other kinds, on the northern islands.

Sea-trout.

Brook-trout.

Mountain trout.

Bullhead.

Marine Fishes.—

Cod, *Gadus* (?).

Halibut, *Hippoglossus* (?).

Flounder, *Pleuronectes* (?).

Herring, *Clupea harengus*, and other species.

Iwashi, *Clupea Melanostica.*

Smelt, *Hypomesus* (?).

Sea-wolf, *Anarrhichas lupus.*

Rock-cod, rock-fish, and keep-fish. Several kinds, as Irish lord, sculpin, sea-robins, *Scorpænidæ and Cottidæ.*

Sharks, *Squali.* Not numerous. The writer has seen seals and sea-otters taken by a large species of shark near the islands.

Deep-sea Fishes.—On three or four occasions, when pulling along off the coasts of the Kurils in search of the sea-otter, the writer found fish which, from drawings and descriptions given in works

on icthiology, he concludes belong to species inhabiting the deep sea.

At different times, altogether four specimens were picked up. On each occasion the fish was in a dying state, although apparently healthy. One, however, had a clean-cut wound on the body. Three resembled *Plagyodus ferox* in almost every particular, and measured 3½ feet in length. The other specimen was a *Scopelus*, with oblong body, scaleless large eyes, and rounded caudal. It measured about 4 feet in length, and weighed about 30 lbs.

When cooked, the flesh of these fish was of the consistency of jelly.

INVERTEBRATES.—*Crabs* of several kinds are common, some of which are particularly well-flavoured.

Mussels are plentiful all along the islands, but they are small in size.

Clams are to be found in Shikotan, but I have not noticed them elsewhere in the Kurils.

Sea-snails.—Large whelks were obtained in Little Kuril Straits by digging into the sand below low-water mark. A smaller shell-fish of this kind is common amongst the seaweed growing on the rocks. Periwinkles of small size are abundant.

Limpets of one or two kinds are common, but not plentiful.

Squids.—Two kinds have been taken by the writer.

Sea-urchins.—Vast quantities of these exist. They are a favourite food of the sea-otter.

Starfish, sea-squirts, sea-cucumbers, sea-anemones, etc., are fairly plentiful.

Medusæ.—Some brilliantly coloured and elaborately formed ones are found.

Sand-fleas are abundant.

Land-snails I noticed on the island of Rashau.

Although oysters are plentiful in some places on the Yezo coast, I have never seen any on the Kuril Islands. The ear-shell (*Haliotis*) is common on Yezo also, but it has not been noticed by the writer on the Kurils.

INSECTS.—The abundance and variety of insect life on the Kuril Islands is not great. The central islands have very few species. On the northern islands insects are rather more numerous; and on the southern members of the chain, which are well wooded, they are fairly abundant.

Coleoptera.—Small beetles of several species are common on all the islands, but none were noticed of large or even medium size. The greatest variety occurs on the southern islands.

Neuroptera.—Dragon-flies (*Libellulas*) are very common on the northern and southern islands; a few seen on the central ones. May-flies (*Ephemeridæ*) and some other species were also noticed.

Hymenoptera.—Humble-bees fairly common, ants (noticed only on the southern islands), saw-flies.

Orthoptera.—Noticed on the southern islands. Grasshoppers, cockroaches, and earwigs.

Lepidoptera. Butterflies are fairly numerous on the southern islands, but they are all small, and number but a few species.

In Paramushir and Shumshir two or three kinds only were noticed, few in number and small in size. Moths are plentiful on Kunashir and Yetorup, mostly of small size, and a fair number of species appear to be represented.

Two or three different kinds only were seen on the northern islands, all small.

Diptera.—Gnats, mosquitoes (*Tipulidæ*), house-flies, flesh-flies, gadflies, sand-flies, etc., and some other kinds.

On the wooded islands mosquitoes and a small green and a small black fly are great pests. During the summer months in calm weather, when shooting or fishing up the streams, it is necessary to wear gloves and a veil, for the mosquitoes and small flies are so numerous and persistent in their attacks upon every bit of exposed skin, that to remain in certain places without some protection from them is almost impossible. On the northern and central islands they are so few as not to be troublesome.

Aptera.—Fleas and lice are plentiful where there are dwellings, and ticks are numerous.

Ticks often get on to the sea-fowl which are nesting on the islands.

The writer on one occasion shot a gull which he thought to be new to his collection, as it had a conspicuous ring extending around its throat and back of the head. On securing the bird, the "ring" was found to be composed of ticks as large as peas. Several auks were caught also, the heads of which were infested with ticks gorged with blood.

Flora.—My notes upon the flora of the islands are very meagre, and, I am afraid, scarcely worth recording.

Kunashir, Shikotan, Yetorup, and Urup are more or less wooded with pines, birch, willow, alder, mountain ash, and other trees and shrubs. There is in places a dense growth of bamboo-grass (*sasa*); and umbelliferous plants, nettles, etc., as high as a man, grow in great luxuriance in the gullies and around the bases of the cliffs and hills which slope towards the beaches. On the sand-dunes and beaches above high-water mark, coarse grasses, a kind of wild pea, and a sweet-smelling rose grow. The flat ground in the valleys is usually swampy, and here are to be found several kinds of rushes, mosses, grasses, and many kinds of wild flowers, amongst which I noticed irises, lilies, daisies, buttercups, pinks, dandelions, myosotis, terrestrial orchids, geraniums, etc.; ferns, sorrel, wild celery, a small wild onion, etc. Several kinds of berries grow on most of the islands. Red currants grow wild on Shikotan. The fruit is large, but full of seeds.

On Kunashir some of the timber is of fine growth; but on Yetorup it is considerably stunted, whilst on Urup it is still more. North of Urup the only *trees* are to be found on Ketoi, where there is a small patch of stunted firs on the north side. Some of the smaller islands have no growth of scrub even, but on most there are generally to be found some scrub pine and alder, and occasionally willow.

The lower slopes of the hills are usually covered with a thick carpet of mosses and short grasses, amongst which wild flowers are abundant. Lichens and mosses occur higher up. Mushrooms and "puff-balls" are to be found, but they are not common.

Algæ.—Probably in no part of the world is there a greater luxuriance of growth of seaweeds than occurs in the waters of the Kuril Islands. Vast forests of *Melanospermæ* surround every island in the chain, the most conspicuous member of this group of algæ being *Nereocystis Lütkeanus*.

Immense fields of this are found everywhere, some of the islands being surrounded by an unbroken belt over half a mile in width. It grows in depths up to about 18 fathoms. The blades are about a foot wide, composed of a central hollow-jointed stem, about the size of the little finger, and with a thin frill on either side. They sometimes measure 140 or 150 feet in length.

The growth of this seaweed is very rapid. In April there will only be seen a few ragged stems—probably the remains of the last season's growth—reaching the surface of the water; but by the beginning of July or earlier, vast fields will have made their appearance everywhere about the coasts, and the growth is so abundant that, unless the current be running with sufficient force to stretch out the stems and partly take them below the surface, a boat can scarcely get through. In July this kelp appears to have attained its full growth. By the end of August much of it has been broken or rotted off, and large quantities get drifted out to sea or thrown up on the beaches.

These kelp beds are the favourite resort of the sea-otter when undisturbed. Here he can find abundant food and life, and sleep in comfort in the worst of weather, for the sea will not "break" on the kelp patches.

Other species of *Melanospermæ* are also abundant, such as *Fucus vesiculosus, Alaria esculenta, Chordaria flagelliformis,* and *Elachista fucicola, Thalassiophyllum clathrus,* etc.

Rhodospermæ.—*Melobesia polymorpha, Melobesia lichenoides, Peysonnellia,* etc.

Chlorospermæ.—*Cladophora uncialis, Ulva latissima,* etc.

Although there is an abundant supply on the Kurils of the same kind of seaweed (*Laminaria saccharina*) that is gathered on the coasts of Yezo and Saghalin, principally for shipment to China, it has not yet received any attention.

V.

CLIMATE, WEATHER, TIDES, ETC.

THE climate of the Kuril Islands is decidedly a moist one, although it cannot be said that the rainfall is large.

The spring is cold and boisterous; during the early part north-westerly winds prevail, and there is but little fog. Throughout the latter half the winds are very variable, with occasional spells of snow, rain, and fog.

Large ice-fields are brought across the Okhotsk Sea in February, and these become blocked on the South-West Kurils and east coast of Yezo, and it is sometimes well into May before all the ice has cleared off from this vicinity.

Fog almost constantly prevails throughout the summer, and, generally speaking, it is only with a fresh north-west wind that it clears off entirely at this season. The clear spells, however, are of short duration.

The autumn is the finest season, bright, clear, pleasant weather, with westerly winds, this sometimes continuing even until the middle of November.

The winter is cold, and north-west winds blow throughout the greater part of it. During the winter the writer spent on the island of Yetorup, there were many fine days when the weather was quite warm, the sun in that latitude—45° north—having, of course, considerable power. The nights, however, were very cold, although it was seldom the thermometer fell to zero Fahrenheit.

The following is a rough summary and average of the weather for each month of the year, gathered from log-books and notes extending over a period of fifteen years.

SPRING MONTHS. *March.*—Sixteen days of west and north-west winds, seven south-east, five east, and three variable. Snow or rain falls on ten days, and two days are foggy.

April.—Westerly and north-westerly winds prevail during the first half. During the last half the winds are very variable, with frequent gales. Snow or rain falls on twelve days of this month.

May.—May has an average of fourteen foggy days, with eight days on which snow or rain falls. The winds are very variable, but southerly and easterly predominate. Gales are frequent.

SUMMER MONTHS. *June.*—Winds very variable, mostly from south-east to south-west. Rain falls on six days, and there are sixteen foggy days. Fog and rain often occur together. Sometimes it is difficult to distinguish between a wet fog and a fine drizzling rain. I have experienced a sharp frost on the 6th of June, at Rashau Island, in Lat. 47° 44′, and a fall of snow sometimes occurs in this month.

July.—This is the foggiest month of the year, with an average of twenty-six days thick weather and six days rain. Light variable airs and calms during the greater part of this month.

August.—It is foggy on twenty days and rains on six days of this month. Calms and light variable winds prevail.

AUTUMN MONTHS. *September.*—Rain falls on ten days of this month, and there is more or less fog on twelve days; but, taken on the whole, the weather is mostly fine and pleasant, westerly winds prevailing.

October.—The winds this month are chiefly from the west-south-west, west, and north-west. There are six rainy days and little or no fog. It is seldom calm; as a rule the weather is bright, clear, and bracing, with fresh breezes and occasional strong gales.

November.—The prevailing winds are westerly and north-westerly. The weather is mostly fine, with fresh breezes during the first part; later it becomes more boisterous, and considerable snow falls.

WINTER MONTHS. *December.*—This month shows twenty days of north-westerly winds, three southerly, and the rest calms and variable. Snow falls on twelve days, and rain on two.

January.—Fifteen days of north-westerly winds, three north, four north-east, and nine variable or calm. Snow on six days, and rain one.

February.—There are twenty-two days of north-westerly winds, two north-east, two north, and two south-east, during this month. Snow falls on sixteen days.

GALES.—Heavy gales are liable to occur at any time of the year, and I doubt if ever any one particular month passes without one or more violent storms of wind. The majority of the gales experienced in these latitudes finished up at north-west. Of fifty-eight heavy gales, occurring between the middle of April and the middle of October over several years, I find thirty-five finished at north-west, eight at south-west, three at west-south-west, three at east, and the rest at other points of the compass. The greatest number took place in May, and the least in June. In nearly all the storms which finished at north-west, the wind veered *against the sun* from the south-east. When a gale commenced at south-east or from any point east of it, it would, as a rule, haul to the east, then north-east, to north, and north-west, where it would blow itself out. With gales commencing at south, the wind, after backing, perhaps, to nearly east, would generally veer *with the sun* through south and south-west, and finish between south-west and west-north-west.

Some of the storms which occur during the summer and autumn in the vicinity of the South-Western Kurils have the characteristics of typhoons—in fact, are typhoons which have travelled up the Japan coast, their area being no doubt much enlarged, and their force somewhat spent.

During a heavy gale the wind blows strongest off the land. The islands being high and *narrow*, the wind becomes banked up as it were, and pours over the mountains and down the gullies with hurricane force, picking up the water in sheets and whirling it into *woollies*, which are blown out to sea with terrific velocity.

Great care is necessary when running in under the high land of these islands during a gale. With a sailing vessel, in a moderate breeze, it is advisable to pass to windward of an island in order to keep the wind; but, unfortunately, the windward side is always the foggy side. The high mountains cause the winds to be very baffling in the various straits, particularly the smaller ones.

The barometer is of great service in these latitudes, and never fails to give warning of an approaching storm. During summer an abnormally high barometer for a few days will nearly always be followed by a steady fall, culminating in a gale with heavy rain from south-eastward.

FOGS.—The constant fogs in the vicinity of the Kuril Islands

and east coast of Yezo during the summer are no doubt caused by the southerly winds passing first over the warm waters of the *Kuro Shiwo* (black stream), and its branch, the Kamchatka currents—the mean summer temperature of which is 82°—and then on to the cold water of the Oya Shiwo, the temperature of which, along the Kurils, is usually from 35° to 36°.

These fogs vary in their nature. Sometimes they are dry, in which case they usually extend to a considerable height, and in calm weather will "lift" some 80 or 100 feet or more above the surface of the sea, leaving it perfectly clear below. At other times the fogs are dense and full of moisture, amounting almost to a drizzling rain. These often reach to a considerable height, and are generally accompanied by a cloudy sky.

Another kind occurs in bands of thick wet fog, which often do not extend to a greater height than 70 or 80 feet above the surface. Above these banks the sun is usually shining from a cloudless sky. In such cases, by going to the mast-head it is often possible to see the land at a considerable distance, when from the deck one cannot see much further than the vessel's length.

The islands are seldom entirely enveloped in fog; there is nearly always a clear space on the lee side. With southerly and south-easterly light winds prevailing during the summer months, the north-west sides of the islands are freest from fogs. With a south-west breeze, the fog travels up both sides, and the clear spaces are at the north-east ends. With *light* westerly, north-westerly, and northerly winds, the fog will lie against the north-west coasts of the islands, whilst the south-east sides will be clear; but with fresh breezes from these quarters, the fog is all blown away into the Pacific, and the atmosphere becomes clear all round. Fog in strata-like bands indicates clearing weather.

When the tops of the mountains can be seen, a change of wind or weather is often foreshown by the formation of small clouds on the peaks. These clouds will invariably be formed first on that side from which the wind is coming. Heavy caps on the peaks denote the approach of bad weather.

Owing to fog, uncertain currents, and unsurveyed waters, the navigation of the Kuril Islands presents, to those who do not know them, many difficulties, accompanied by considerable anxiety.

Those, however, who are familiar with the islands find comparatively little trouble. The deep water with which they are mostly surrounded enables them to be closely approached without risk. The large fields of kelp which grow about all the islands, in depths up to 15 fathoms, is a warning that the land is not far off. The roarings of the sea-lions on their rookeries; the cry of the kittiwake gulls on certain points and cliffs; the flights of thousands of guillemots off others; the presence of flocks of auks, puffins, fulmars, and other birds which are known to frequent certain localities or to be peculiar to certain islands; the *smell* of the sea-lions' rookeries, and also of the sulphur fumes from the volcanoes, which are wafted off to the ship; the presence of a tide-rip, and many other little things, all serve to show the vessel's position, and help to guide her to her destination.

When close in shore under the volcanoes of these islands, a vessel's compasses are liable to be affected. That mountain masses are liable to influence a ship's compass a mile or two out at sea has been questioned; but there is no doubt of the fact of the compass being affected when within, say, half a mile of the shore in the vicinity of some of the volcanoes. This is particularly marked at the north-east end of Yetorup, the Black Brothers, the south-west end of Simushir, and other places.

I may here mention a peculiar phenomenon which I saw one night in the month of September, off the coast of Yetorup—something similar to which is described in Clarke Russell's novel "Marooned." About half-past nine o'clock on the night of September 4, 1885, when within a few miles of the south-west end of Yetorup, on the Pacific side—the sky being clouded over, and the night very dark, with a light south-west wind and somewhat rough sea—a bright glare was seen to the southward, and appeared to be approaching the vessel. At first, in the distance, it looked like bright moonlight shining through a rift in the clouds, but as it was within four days of new moon, that could not be. As it approached, which it did at a considerable rate, in a fitful darting manner, it appeared to be in the form of a luminous cloud, about 100 yards or so in extent—a sort of gigantic *ignis fatuus*.

This remarkable cloud of light was anxiously watched by those on deck, who, with a certain amount of disquietude, speculated as to what effect such an uncanny-looking thing would have

on themselves or the vessel, for which it seemed to be directly making. On it came, and suddenly enveloped the vessel, the light being sufficiently bright as it passed to show the time by a watch drawn from the pocket.

At this time the wind was very light. The phenomenon, whatever it was, appeared to move independently of the wind, for some eight minutes later it returned, passing the vessel a short distance off in the opposite direction.

ICE.—About the 10th of February ice-fields begin to make their appearance off the north-west coasts of the Southern Kurils.

This ice is formed in the northern and north-western parts of the Sea of Okhotsk, and as it gets broken up is carried by currents and winds across that sea to the islands, where it often blocks the coasts and straits for hundreds of miles. The wind has much more to do with the direction these ice-fields take than the currents, a moderate breeze being sufficient to drive the floes even against the Oya Shiwo.

The surface of these fields of ice is very uneven and hummocky, thus giving the wind considerable hold, the piled-up masses acting as sails. The thickness of this ice usually varies from about 12 to 30 feet, the snow upon it adding considerably to its bulk.

These ice-fields eventually all find their way through the straits into the Pacific, where, after being driven beyond the cold waters of the Oya Shiwo, they are quickly melted. The ice often fills the space between Yetorup, Kunashir, the eastern coast of Yezo, and Shikotan, and sometimes it finds its way down the south-east coast of Yezo, almost as far as Cape Yerimo. During the early part of April this year (1892) the ice was driven into Kushiro on this coast, wrecking two small steamers which were lying there. In April, 1887, the American whaler *Europa* was forced on to the shore of Kunashir by the ice, and was lost. By the middle of May, as a rule, the ice has all disappeared.

TIDES, CURRENTS, ETC.—The tides on the Kuril Islands are often irregular. The flood stream sets through the various channels to the north-westward, and the ebb to the southward. The rise and fall is from about $3\frac{1}{2}$ to 6 feet.

Through the various straits the stream at times rushes with a speed of four and five knots, resulting in very heavy tide-rips off the ends of the islands. These rips are occasionally so bad that

it is impossible for a boat to live in them, and a sailing vessel requires a fresh breeze in order to keep steerage way and get through. With but a light breeze, a vessel's sails and rudder are but of little use to her, for she is carried along hither and thither by the current, whirled round and round, utterly helpless, in one of these seething, swirling, roaring rips. Fortunately, the tendency is to set the ship away from the shore rather than towards it.

Navigating-Lieutenant Neville, in the "China Sea Directory," has the following note on one of these tide-rips: "H.M.S. *Cormorant* made for this channel (Pico or Kunashir Strait), but, when close to, observed a line of heavy breakers extending right across. She then stood nearer the island of Eturup, in the hopes of finding a passage, but in vain. Night coming on, it was not possible to verify the fact of its being shoal, but the sea broke perpendicularly 20 to 25 feet high, and unlike any tide-ripple."

This, however, was a tide-rip. There is no shoal, but a considerable depth of water in this strait.

These rips, although they sometimes extend a considerable distance, are, as a rule, not very wide. The sea on both sides may be perfectly smooth, whilst in the rip, especially at its edge, it is thrown into boiling, foaming, swirling waves and breakers, rising in short high seas from every direction.

The nearer the rip, the greater appears to be the strength of the stream. On several occasions the writer has had the greatest difficulty in avoiding being drawn into these rips, after having approached nearer than was prudent, in a fast hunting-boat pulling five oars and a paddle.

These rips are usually at their worst about the time of new and full moon, and after easterly and north-easterly winds. They are always intensified where a current of considerable depth strikes a shoal or ledge with abrupt sides, and at the same time meets with a cross-current, as off both ends of Urup, in Srednoi Strait, and in other places.

Several hunting-boats have been capsized in these rips, and all hands drowned.

Currents.—The Oya Shiwo, which is the Arctic current, sets along the east coast of Kamchatka and down the Pacific side of the Kuril Islands, then along the south-east coast of Yezo, and

along the Niphon coast to Kinkasan, where it meets with the warm Kuro Shiwo coming from the opposite direction, and either mingles with its waters or sinks beneath the surface and continues its course as an under current. Its influence is sometimes felt as far south as Inuboye Saki, where, in the month of April, to the northward of the cape, the temperature of the sea has been found to be 42° as against 62° to the eastward of it. Throughout the summer the Oya Shiwo appears to be coldest at the surface along the Kuril Islands, where its temperature I have found to be, in April, 30°; in May, 33° to 35°; from June to middle of August, 35° to 36°; and from that time to end of October, 37° to 42° Fahr. The reasons for this, I venture to think, are as follows: The Arctic current, flowing to the south-westward through Bering's Strait and along the coast of Kamchatka, has its coldest water deep beneath the surface, and this colder water does not get brought to the top until it meets with obstructions like islands and the cross-currents flowing between them. Where no such obstructions exist, or only to a small extent, as, for example, along the Kamchatkan coast and the coasts of Yezo and Niphon, the surface water of this current is several degrees warmer.

As confirming this theory, I may mention that last summer (1891), when on a voyage to the Bering Sea and Arctic Ocean, the islands of St. Matthew and St. Lawrence were visited. Both these islands were enveloped in thick fog when we approached them, but their near presence was indicated by a sudden fall in the temperature of the water of from 7° to 10°.

Here the colder water from below had evidently been brought to the surface by meeting with the submerged portions of these islands. This band of colder surface water did not extend more than a few miles from the shore.

The fact of the Oya Shiwo, in the vicinity of the Kuril Islands, being at its warmest in the autumn, is attributable partly to the temperature of the air being then much higher—the sun having considerable power from there being little or no fog—and partly to the fresh westerly breezes which then prevail, which naturally drive some of the warmer water of the Okhotsk Sea into it.

The Oya Shiwo varies in extent and velocity at different seasons. In winter the current is wider and also stronger. During the summer its speed is about three-quarters to one knot per hour,

but occasionally its velocity is nearly doubled by north-easterly winds and other causes.

The Oya Shiwo has been said to take its origin in the north-western part of the Sea of Okhotsk, whence it flows in two currents, one down the eastern coast of Saghalin, the other down the western shores of Kamchatka, and through the Kurils into the Pacific (*vide* Captain A. R. Brown's paper on the "Currents of the Japanese Islands," vol. ii., *Transactions of the Asiatic Society of Japan*, April, 1874). A current of considerable strength does set to the southward along the Saghalin coast, but it is not part of the Oya Shiwo. So far as my experience goes, I have not found a current setting down the western coast of Kamchatka and through the Kurils into the Pacific, but, to a limited extent, rather the reverse.

A vessel on the Okhotsk Sea side of the Kurils, if out of the immediate influence of the tides running backwards and forwards through the various straits, will always be set to the northward or north-eastward during calms, or when the winds are not sufficiently strong to counteract or deflect this current, which, as a rule, runs at the rate of about 10 miles in twenty-four hours. The temperature of this current is some 5° or 6° higher than the Oya Shiwo.

During the winter months, when north-westerly winds prevail, a surface current is naturally created across the Okhotsk Sea towards the Kuril Islands, and this accounts for the large quantities of driftwood piled up on the beaches of the north-western sides of the islands, as well as for the ice-fields which are driven across. The wind is the chief, if not the only, factor in producing this current. It is not constant like the Oya Shiwo, and ceases when the winds cease.

VI.

DETAILED DESCRIPTION OF EACH ISLAND AND THE STRAITS BETWEEN THEM.

KUNASHIR, the first of the Kurils commencing from the south-western end of the chain, extends far into the wide bay, the shores of which form the eastern coast of the island of Yezo, between Capes Sirotoko and Noishaf. Yezo Strait, which separates this island from Yezo, is from 8 to 16 miles wide. At its narrowest part, off the south-west end of Kunashir, it is much congested by sand-banks, which are continually shifting. The straits have been fairly well surveyed, but the island of Kunashir has not yet received much attention.

This island is 64 miles long, and from about 2 to 16 miles wide, and has an area of about 444 square miles.

There is a permanent population of about 1475, which is largely increased during the summer months by fishermen, who resort to it for the capture of herring, salmon trout, and salmon.

The only settlement of any size is the village of Tomari, at the head of the bay of that name, at the south-west end of the island. There are various fishing-stations along the coast, and some houses at the sulphur-mines of Shishiki, at the foot of Rouse Mountain, towards the middle of the island. These sulphur deposits are now practically exhausted.

There are no harbours on Kunashir, and the coast on both sides is rocky. The southern point, Cape Keramoi, is a low narrow tongue of land extending some 6 miles in a southerly direction. Cape Moimoto, the north-eastern point of the island, is terminated by a high square-looking bluff, which at a distance looks like an islet; it is, however, joined to the main island by a narrow, low sandy neck. A dangerous reef, in some places awash, extends

off this cape for a considerable distance in a north-easterly direction.

The north-eastern portion of Kunashir is laid down on the Admiralty charts 5 or 6 miles too far south.

The chief feature of this island is its noble mountain, called on charts St. Anthony's Peak, but known to the Japanese as Cha-cha-nobori. This magnificent volcano is 7400 feet high, and is the second highest mountain in the Kurils, Alaid Peak only exceeding it in elevation. In form it is a truncated cone, with a second peak rising out of the crater of the lower one.

The outer crater of Cha-cha-nobori is said by the natives to be filled with water, thus rendering the inner cone inaccessible. That a considerable quantity of water from rain and melted snow gets into the crater is certain, but that it remains there I very much doubt, as the area from which the water can drain into it is not large, and evaporation and the percolating of the water through the earth would soon cause it to disappear. A rugged ridge of mountains to the north-west of Cha-cha-nobori extends out to Cape Rewausi, the north extreme of the island. Besides the mountains on the northern part of Kunashir, there are two other conspicuous masses, the second being near the middle of the island. The highest peak of this group is called Rouse-nobori, and is 3020 feet above sea-level. In the ruined crater of this there are hot-springs, fumeroles, and the deposit of sulphur already mentioned. The third mountain is at the south-west end, and is only 1611 feet high.

Between these three groups of mountains the land is comparatively low, with small hills and peaks, valleys and swamps, which are covered with vegetation.

Kunashir is fairly well timbered, firs predominating. The lower lands are covered with forests and grasses, the sasa or bamboo grass being very thick. The valleys are generally grassy and swampy; the spurs of the hills covered with groves of timber and isolated trees. The general aspect of the surface of the island is similar to the smaller one of Shikotan, lying 30 miles to the eastward. The coarse, rank vegetation, such as prevails on some of the islands further north, is of limited extent.

Bears, wolves, foxes, land-otters, martens, and squirrels are found on the island. The sea-otter is found about the reefs and

kelp-beds at the north-east extremity of Kunashir, but for some reason he does not venture further to the south-west. Leopard seals are numerous, and the straits and bays are favourite feeding-grounds for whales and porpoises.

Trout of several kinds are found in all the streams, which are also visited by salmon and salmon-trout at certain seasons. Immense shoals of herrings and iwashi (a kind of sardine), miles in extent, pass along and off the coasts of the island.

SHIKOTAN, lying to the eastward of the Kunashir, and about 40 miles north-east by east from Cape Noyshaf, has a length of 14 miles and a breadth of about 6, its area being 70 square miles.

The coasts of this island are indented with innumerable small bays and coves, several of which form land-locked harbours. The chief of these are Shakotan in the north corner of the island; Anama, about the middle of the north-west coast; and Matsugahama, near the southern corner of the south-east coast. In addition to these, there are four or five others suitable for small craft. The shores are very rocky and in many places bordered with steep cliffs. Most of the bays have sandy beaches inside, the entrances invariably between rocky bluffs.

The land is very rugged, the whole island being a mass of irregular hills and valleys running in every direction. Its highest part is a roundish-topped hill near its northern corner, which reaches a height of 1357 feet, and there are half a dozen other hills in different parts of the island over 1000 feet high.

Shikotan is not thickly wooded, though there is no want of timber of fair size. The trees grow principally on the spurs of the hills. The valleys are swampy and covered with coarse grass; *sasa* or bamboo grass, like that of Yezo, is found in patches. In every valley there are streams in which trout abound; salmon and salmon-trout are plentiful in the bays and streams at certain seasons, but the island is not fished by the Japanese. In the bays smelt, flounders, and rock-fish are found, whilst clams are plentiful in places where the bottom is more or less muddy.

During the summer a number of Japanese fishermen are sent here for the purpose of gathering seaweed. This is dried by exposure to the sun on the beaches, put up in bundles, and shipped away to China *viâ* Hakodate.

In Shakotan bay the remnant of the Kurilsky Ainu, numbering

some fifty-nine persons, has been established. They are under the charge of a Japanese official and doctor, and are the only permanent residents of the island. They have some cattle and sheep, and cultivate a few plots of ground.

Although the aspect of Shikotan from seaward is perhaps not very inviting, on closer acquaintance it is found to be a beautiful and picturesque little island, differing in most of its characteristics from the other islands. It is capable of being cultivated to a considerable extent, and would be most suitable, I should say, for cattle-ranching. Deer would thrive well, but there are none on the island, the only land animal being the fox. A few leopard seals and sea-lions and an occasional sea-otter are to be met with around the coast. Wild-fowl are fairly numerous in spring and autumn, and a few ducks breed here. The island has been well surveyed by officers of the Japanese navy, and the chart published.

The space between Shikotan and Cape Noishaf is occupied by a number of low flat islands, islets, and rocks, which at one time were no doubt connected with the long tongue-like cape which projects from the eastern side of Yezo, which they closely resemble. The largest of these islands is Shibotsu, with an area of 17 square miles; Suisho is next in size, with $3\frac{3}{4}$ square miles; then follow Taraku with $3\frac{3}{4}$ square miles, and Yuru with $2\frac{1}{2}$ square miles. Akiyuri, Harukaru, and the remaining islets, reefs, and rocks are together equal to about 1 square mile. The Shikotan Channel is 11 miles wide between the island of that name and Taraku. In this channel there is a shoal called Amagi Reef, lying some 5 miles to the north-east of Taraku; and 4 miles to the south-east of this island there are three or four clusters of rocks and islets called Todo-shima, which are a resort of the sea-lion.

The ever-present fox is found on these islands, which are the breeding-places of various kinds of sea-birds. Leopard seals are numerous, and now and then a sea-otter is met with. The islands are only of value for the seaweed which is gathered here.

All these islands and the channels between them have been recently surveyed by the Japanese, and the charts issued.

Kunashir Channel.—Yetorup is separated from Kunashir by the Kunashir Channel, as it is now called, but marked on old charts as Pico Channel and Catherine Channel. This strait is about 12 miles across at its narrowest part. It has deep

water throughout, even close in to its shores. The only danger is Cape Moimoto and the reef which extends off it. In this channel there are often very heavy tide-rips and overfalls, the worst being off the point to the south of Stake Bay, on Yetorup, extending in a westerly direction towards the opposite cape of Moimoto. At times the rip is so bad that no open boat can live in it, the tides and currents meeting and causing the most stupendous swirls and breakers. On such occasions a sailing vessel is helpless, unless she has a fresh breeze; but there is little or no danger of being set on shore. With high land on both sides, the wind during a gale blows through this channel with terrific force. The coasts on both sides are steep and rocky, and lined with kelp-beds. On the Yetorup side there is a sea-lion rookery, about a couple of miles from Cape Tesico. During February, March, April, and May, this strait is often blocked by ice-fields from the Okhotsk Sea.

YETORUP.—The island of Yetorup is the largest and most valuable island in the whole chain. It is 110 miles in length, varying in width from about $2\frac{1}{2}$ to 20 miles where the peninsulas on which the mountains of Atosa and Chirituba project almost at right angles to its general direction of length. The total area of the island is about 930 square miles.

Yetorup may be said to be made up of eight principal groups of mountains, connected in some places by comparatively narrow, low, and flattish land, and in others by higher plains and low hills.

(1) Beritaribi Mountains, at the south-west end, are about 4100 feet high.

(2) Roko Mountains, the next group to the north-east, are about 3000 feet above sea-level.

(3) Atosa Mountain, the volcanic peak on the north side of Naibo Bay, has a height of 4050 feet, and another peak to the eastward of it is not so high.

(4) Hitokapu Mountains, on the west side of Hitokapu Bay, reach to a height of about 4800 feet.

(5) Hotoko Mountains, on the east side of the above-named bay, have peaks from 2600 to 5000 feet in elevation.

(6) Chirip Mountains, on the peninsula to the north of Shana and Bettobu, rise to a height of 5040 feet.

(7) Mountains to the north of Bear Bay are 4200 feet high.

(8) The volcano on the south side of Bear Bay is about 3800 feet in elevation, whilst the mountains lying to the eastward of it are about 2200 feet.

Steam issues from Beritaribi, from two or more of the Hotoko group, Chirip, and from the volcano at the north-east end of the island. The latter was in violent eruption in 1883. A sulphur deposit in the Beritaribi Mountains was worked some years ago, but it has been abandoned. There are several hot springs in different parts of the island. The coast of Yetorup is bold, and there are no off-lying dangers even to within half a mile from the beach.

On the south-east coast the two largest indentations are Roku Bay, near the south-west end, and Hitokapu Bay, about the middle of the island. Although the first-named bay is of considerable size, it is not shown on charts. The best anchorage is in its north-eastern corner, but it is open from east to west-south-west. Water can be got here from a small stream falling from the cliffs on to the beach, which is protected from the surf by some rocks and a small rocky point.

Hitokapu Bay is about 6 miles deep, and the same in width, the points at entrance lying almost east and west of each other. The western point is low, and forms part of a fairly level expanse of country at the base of the Hitokapu Mountains. Off this point is a reef with kelp growing on and around it. About two miles inside the point is the river and station of Onebets. There are but two houses here, which, however, are not always occupied. Nearer the point is a small stream where water can be obtained. The western point of the bay is made up of high steep bluffs, with a narrow margin of bouldery beach at their foot. A mile or two inside the land becomes low, with a beach of cobble stones. Around the head of the bay the shore is mostly of fine sand. At the northern extreme of the bay there is the station of Toshimoi, consisting of two or three houses on the banks of a river flowing from a large lake. Trout and salmon are taken in the streams. Cod, halibut, and rock-fish are plentiful in the bay. Numbers of whales frequent this place, and I have counted as many as seventy of these huge creatures in sight at one time here. This bay affords fair shelter from all winds on one side or the other.

To the north of the Cygnet rocks are two small coves, in one of which is the station of Toshiure, where there are one or two Ainu houses. Small vessels can take shelter here, and obtain wood and water. There are no villages or places of importance on the south-east coast of Yetorup.

The Okhotsk or north-west coast of Yetorup has a much longer shore-line than the Pacific or south-eastern side, owing to the three or four peninsulas which project from the main part of the island. All the principal settlements and fishing stations are on this side, the reason being that the lakes and streams are more numerous, the coast is more easily fished; and, further, it is the lee side of the island during the summer months, and consequently freer from fogs. At the north-east end of the island is Bear Bay, about $5\frac{1}{2}$ miles across, and $2\frac{1}{2}$ deep. The small station of Moyeru is here.

The principal villages and fishing stations of Yetorup are Furebets (the official capital), Shana, Naibo, Bettobu, Shibetoro, Sukeya, Rubets, Rouse, Makoimai, Moyeru, Toshiure, Toshimori, Tanemoi, Mohekiohi, and Oito. The total population was 1343 in 1890. There are no good harbours with complete shelter.

The lower hills and plains are well wooded with birch, pine, alder, etc. *Sasa* (bamboo grass), nettles, *fuki* (petasites), and various umbelliferous plants and other coarse vegetation grow so thickly that it is almost impossible to get about the island, except up the watercourses or by the beaten tracks.

Bears were formerly very numerous in Yetorup. A few wolves exist, but they are rarely seen. Foxes are plentiful, as are also land-otters. Martens and hares also exist.

Bird life is identical with that of Kunashir and the eastern part of Yezo. I have never met with any reptiles on the island. With the exception of flies, mosquitoes, and sand-flies, which are great pests, insects are not numerous.

Previous to 1875 sea-otters in considerable numbers frequented the south-east coast of this island; but the hunting of this valuable animal has been so keenly pursued by the Japanese from the shore, as well as from vessels under foreign flags, that they have been all but exterminated. Several thousands have been captured, and nearly all were sent to the London market.

Sea-lions are found on a rookery at the south-west end, on

the Cygnet rocks, and on a cluster of rocks near the north-east end. Leopard seals are plentiful all round the island.

The charts of Yetorup are very imperfect. Although the alterations of late years have been considerable, each one appears to make matters worse rather than better. On the latest Admiralty chart, with *corrections* (?) to 1890, Cape Vries is laid down about 5 miles too far north, and Cape Seworsi about 2 miles too far south, thus making the north-eastern part about 7 miles broader than it really is.

YETORUP STRAIT, as it is now named, but marked on old charts Vries Strait, is 19 miles across from Cape Okabets on Yetorup to Cape Nobunots on the island of Urup. It is free from danger on the Yetorup side, but off Cape Nobunots there are some rocks and a reef extending out into the strait to nearly a mile. This reef is covered by an immense kelp-bed, the long streamers of which, however, are often carried out of sight below the surface of the water by the strong currents. There is a shoal patch on this reef on which the sea breaks in a heavy swell. Off the point and over the reef very heavy tide-rips are formed. Lying about 2 miles north-west of Cape Nobunots is a high rock called Sail rock. This strait is sometimes blocked by ice in the spring.

URUP, the fourth largest of the Kurils, is 60 miles long, with an average width of about 6 miles. It has an area of 298 square miles. It is uninhabited except during the summer fishing season.

There are four principal mountain groups, separated from each other by lower land. Proceeding from the south-west, the first group is about 14 miles up the island, the highest peak reaching about 3650 feet. Twelve miles further up is the second group, one mountain in which is some 3750 feet high. Ten miles beyond we come to the highest peak in the island, 4150 feet above sea-level, with another of 3800 feet in the same cluster. In this group one or two of the mountains are giving off steam. Still further to the north-east is the fourth mountain mass, with peaks, in the latitude of Cape Nobu, 3750 feet and 3650 feet in elevation, the end mountain being about 2700 feet high.

Between these groups of mountains the land is much lower and narrower, forming three bays on the north-west coast of the island. Streams flow into these bays, and it is here the Japanese now and then establish fishing stations.

All the mountain masses lie on or near the north-western coast, and make that side of the island high and bold, much of the land terminating in almost perpendicular cliffs, with no beach at foot.

The south-east or Pacific side of Urup is much less bold than the Okhotsk side. Its coast is rocky and practically without a bay throughout its whole length, but there are many small rocky bights; and, about halfway up the coast, there is the small basin-like harbour called Port Tavano. The entrance to this is about 120 yards wide, between bluffs, where there is a depth of water of from 8 to 10 fathoms.

This harbour is only suitable for small vessels. With the wind from the eastward, a heavy swell rolls in. There are some rocks just above water near the centre of the harbour, with from 4 to 5 fathoms of water close to them. Two small streams flow into this place. This harbour was the site of the factory established by the Russian-American Company in 1795. The village was inhabited by Kurilsky Ainu up to 1878.

The north-east end of the island terminates in a long, flat, and narrow tongue of land 80 or 100 feet above sea-level, extending some 5 or 6 miles from the slope of the north-eastern mountains, where it has a width of about 2 miles, and gradually narrowing to a ridge towards the point, through which, for about 2 miles of its length, the sea has made breaches, giving it the appearance of a row of "bluffy" islets.

About 4 miles from the point on the north-west side are the Twin Islets, two small peaked islands lying about a mile off shore, a reef covered with kelp extending out to them.

There is a danger in the form of a sunken rock some 2 or 3 miles off shore, about 5 miles in a south-south-west direction from the point. It shows only in a high swell, when the sea breaks upon it. From 12 to 35 fathoms of water was found on sounding in its vicinity. Its location could not be fixed when discovered, owing to fog.

The highest part of the Urup Mountains are bare of vegetation, and covered with snow during the greater part of the year. Lower down they are overgrown with mosses and grass. On the lower grounds there is plenty of timber, but none of large size; pine, birch, and alder is the most common. In the valleys and on the

slopes of the hills there is a dense growth of coarse vegetation. The *sasa* or bamboo grass does not extend beyond this island.

Fish are plentiful in the streams, but there is no sea-fishing off the coast. Vast beds of kelp extend all along the south-east coast, and it is plentiful also on the opposite side of the island.

Sea-otters are found here, their favourite haunts being around the reefs and rocks near the ends of the island. Leopard seals are numerous, and there is a sea-lion rookery on a rock at the south-west end close to Cape Nobunots.

The only land-animal I have seen here is the fox, but I believe there are land-otters also. There are no bears on the island. Land-birds are much less numerous than on Yetorup. Gulls, guillemots, puffins, and shags make a breeding-place of the steep isolated parts of the north-east point.

Anchorage may be got in any of the bays on the north-west side, where wood and water can be obtained during fine weather, or when the wind is off shore. On the Admiralty charts the coast-line from Port Tavano to the north-east end is laid down with a trend much too northerly.

The remains of several old wrecks are to be found on the south-east coast. Close to Cape Nobunots, on a ledge of rocks and boulders beneath the cliffs, is a large ship's anchor and some chain, all that is left of a whaler which was lost here many years ago. Towards the north-east end is part of the hull of another, whilst further along the bleached timbers of one more may be seen. In the summer of 1891, a Japanese hunting schooner was lost with all hands on the north-east point.

Urup Strait, between Urup and the Black Brothers, is 13 miles wide. The tides sweep through at considerable rate, giving rise to awkward swirls and rips. Although this passage is free from rocks, it is not advisable to take it during foggy weather, as the long low north-east point of Urup is not easily distinguished like high land, which can often be seen above the fog.

The Black Brothers, as they are usually called—Rebuntsiriboi and Brat Chirnoi of the charts—are two small islands lying north-east by north from the north-east point of Urup. Looked at from the south-east, these two islands present a somewhat similar appearance, a high cone-shaped peak, and next it one of less elevation, joined to which is another still lower.

The Southern Brother is about $2\frac{1}{2}$ miles long, and has an area of $3\frac{1}{4}$ square miles. The principal peak of this island is on its western side, and reaches a height of 2470 feet. It is an old volcano, apparently long extinct. On its sea side is a hollow which looks like the ruins of an old crater. The smaller peaks extend in a north-easterly direction from the highest one.

Except on its steepest parts, which are on the western side, the whole island is overgrown with grass and mosses. There is no timber or scrub.

On its western point is a large rock resembling a lion *couchant*, and a short distance above this is a rocky ledge frequented by thousands of sea-lions. There is deep water close in to the land nearly all round, but on its north side, in the small strait separating the two islands, there is a high islet with a reef extending off it for nearly a mile in a south-easterly direction. There is a depth of water on this ledge of from 5 to 20 fathoms, with here and there a rock above water and some awash. This reef is usually covered with large beds of kelp.

The strait between the two islands is about a mile wide, with deep water throughout, with the exception of the ledge already mentioned.

The Northern Brother is $3\frac{1}{2}$ miles long, and has an area of about $3\frac{3}{4}$ square miles. It has three conspicuous conical peaks, the northernmost being the oldest and highest. It is now extinct, and a great part of the crater has fallen away on the north-western side, leaving cliffs which are nearly perpendicular. The height of this peak is 2360 feet. Projecting from its southern slope there is an active volcanic cone of less elevation, 2170 feet; and again, from the southern side of this latter, but a step lower, there is another. Both these send forth steam, and the lower one is occasionally in violent eruption.

This island is almost bare of vegetation, the only bit of green to be seen being on its north-eastern point, which is covered with grass and moss. Strewn around the foot of the volcanoes are masses of black-looking rock, which from a distance appear not unlike trees. As is usual with volcanoes, the upper slopes are covered with finer materials, one effect of which is to make the upper part of the mountain appear lighter in colour than the lower part.

On the eastern side of the north island there is a small bay

formed by two narrow points which reach out nearly a mile. Anchorage in 13 fathoms with a sandy bottom can be got here.

There is no water fit for drinking purposes. On the northern beach is some driftwood.

Besides sea-lions and sea-otters, there are a few leopard seals about. There are no land-animals. The land-birds are confined to a few ravens, peregrine falcons, wagtails, and wrens. Auks, puffins, guillemots, gulls, fulmars, and shags are very plentiful. No fish are to be got here.

MAKANRURU, or BROUGHTON ISLAND, lying 10 miles north-north-west of the Black Brothers, is roundish in form, about 5 miles in circumference, with an area of about 2 square miles. It is a rugged dome-shaped island, 2900 feet high. Inaccessible cliffs, some of which are over 1000 feet high, extend all round the island. Here and there beneath the cliffs are narrow margins of bouldery or pebbly beach. On the north-west side there are some rocky bights, and also some rugged patches of rocks, the largest of which is used as a breeding rookery by vast numbers of sea-lions. There are some pumiceous rocks off the south-east side. The water is deep to close in to the shore.

Sea-fowl common to the other islands are plentiful. The land-birds I have noticed were ravens, falcons, wagtails, and wrens. Besides sea-lions, a few leopard seals and an occasional sea-otter are to be met with.

Like the rest, the island is volcanic, but it has been long extinct, and is now, except in the highest portions, green with short vegetation.

The BOUSSOLE CHANNEL, lying between the last-mentioned small islands and Simushir, is the widest of all the straits of the Kuril Islands. It has deep water throughout, and is free from all dangers. The distance across between the Black Brothers and the south-west end of Simushir is about 32 miles.

SIMUSHIR is 33 miles long, and from 2 to 8 wide. Its area is 126 square miles. From a distance, looking towards the north-west, this island is seen to have at its south-west end a high volcanic mass, which has been named Milne Mountains, showing two peaks which reach a height of 5650 feet. Next comes a low narrow neck of land joining this part to a ridge of hills which gradually rise to a round-topped mountain 2300 feet high. This is

about halfway up the island. Further up is the grand volcano called Prevost Peak, 4450 feet in height, one of the most symmetrical mountains in the Kuril chain.

To the north-east of this is a ridge of peaked hills extending to Broughton Bay, on the east side of which is Uratman Peak, 2000 feet above the sea.

On the north-west side of Milne Mountains is a small volcanic peak which is active, and which in September, 1881, was in violent eruption. The other volcanoes are extinct or dormant. The south-west coast is steep and bold, and what few rocks there are, are close in to the shore. There is a small sea-lion rookery on this coast about 3 miles from Cape Aronte.

On the north side of Milne Mountains the coast is deeply indented, forming Milne Bay, where anchorage can be got with sandy bottom, and where water can be procured. On the Pacific side, opposite this bay, the coast also runs in, narrowing this part of the island to about 2 miles or less. The north-west coast is rocky, with many kelp patches along it; all the rocks are near the shore.

The south-east coast is very free from rocks comparatively, the few there are extending off no distance. Above Prevost Peak the land makes in considerably, forming Prevost Bay.

At the north-east of the island is Broughton Bay, a crescent-shaped basin of water about $2\frac{1}{2}$ miles in extent. This bay is evidently an old crater, and would be circular in form but for the Uratman volcano, which projects into its eastern side. Surrounding the bay is a ridge of pumiceous and rocky hills, forming the edge of the old crater. Through the narrowest part of this, which is on the north-east side, the sea has made a breach. This entrance is in Diane Strait, about midway between the north-west cape and the north-east cape, and is between a bluff on its eastern side and a short low shingly point, projecting from the foot of a roundish hill, on the west side. The passage is less than a cable wide, with from 10 to 12 feet of water. There is a large bed of kelp just outside and in the passage, which it is necessary to pass through to enter the bay. The tide runs in and out with considerable speed. Inside the bay the water is very deep, and it is necessary to go close in to the beach before an anchorage can be got.

The remains of a village, which at one time was one of the

chief settlements of the Northern Kurilsky, are to be seen on the eastern side of the harbour.

Around the bay some small trees and scrub grow, but the other parts of the island have a very scanty supply of vegetation, many parts, particularly the south-western, being quite bare. There are considerable quantities of driftwood on the beaches of the north-west coast.

The streams are few and very small, and fish are scarce.

Foxes, which are numerous, are the only land-animals. Sea-lions are plentiful; besides the rookery at the south-west end, already mentioned, there is a large one about two miles below the north-east cape on the Pacific side. Leopard seals are common, and sea-otters scarce.

Land-birds are few in number; sea-fowl are fairly numerous. Immense flocks of harlequin ducks are seen here during the summer.

On the Admiralty charts this island is shown with a length of only 27 miles, and lying north-east by north and south-west by south; whereas it should be 33 miles in length, with its general direction north-east and south-west.*

KETOI.—The next island to the north-east is Ketoi. The channel between is called Diane Strait, and is 8 miles wide. The island is of a squarish form, about 6 miles through north and south, and rather more east and west. Its area is 35 square miles.

It shows a mass of mountains with several volcanic peaks, not one of which, however, stands out as an isolated mountain. Its highest part is on its north-western side, where the peak attains a height of 3800 feet. Another near the centre of the island is 3400 feet high. Steam issues from a crater in the north-western corner, and from another near the central northern part. On the west and north-west the land terminates mostly in high and almost perpendicular cliffs, with deep water close in to them. On the north shore the cliffs run back inland a short distance, leaving at their base an expanse of low flattish land. This continues for about a mile and a half, when the cliffs again border the shore round to the north-eastern side. From this the land gradually slopes to the eastward and southward to the lowest part of the island.

* Corrected in Chart No. 2405.

There are rocks and reefs off the south-east coast to a distance of nearly 2 miles. All round the rest of the island the coast may be approached with safety. Anchorage may be got off the north shore in 10 to 12 fathoms, and off the south side in 12 to 15 fathoms on a rocky bottom. On the east side of the south-east point there is a rocky bight where a landing can be effected at almost any time.

There is a sea-lion rookery on the south-west point, and another on the south-east point. These animals also frequent the rocks off the east cape, but it is not a regular rookery. A few sea-otters and leopard seals are to be found.

Foxes are the only land animals. Fish are not to be obtained; the streams are very small, and water is difficult to obtain. There is some scrub on the island, and a patch of fir trees on a slope facing the northern shore.

Birds are not numerous, there being few suitable breeding-places for them. Amongst the fir trees mentioned I came across a colony of nutcrackers (*Nucifraga caryocatactes*), birds I have not noticed on the other islands north of Yetorup.

Ketoi Strait, 13½ miles across, is free from dangers.

USHISHIR, on the north-east side of Ketoi Strait, is composed of two islands, each about a mile and a half in length, with a narrow bouldery reef about two cables long between them. Their area is about 1½ square mile. The north island is of an elongated diamond form. It is surrounded by steep cliffs with a narrow beach beneath them. At its northern extremity it is about 80 feet high, with a level and gradual slope upwards to its southern point, which is some 300 or 400 feet high. The south island of Ushishir is the larger, and reaches a maximum height of 1360 feet.

It is a volcanic crater which has been breached on its southern side, giving access to the sea. The entrance is between two low spits, but there is only sufficient depth of water for a boat. Inside the crater the water is deep. There are boiling springs and fumeroles from which much steam issues. This crater has been more fully described when speaking about the volcanoes.

A high dome-shaped rock lies close to the south-east point. Babuskin rock, off its western point, is high and flattish on its topmost part, but rugged on the lower ridges. On the north point is a deserted village formerly inhabited by Kurilsky Ainu.

The best anchorages on Ushishir are between its two parts on

either side of the connecting reef, but nearer to the south island. In west bay the bottom is sandy, with a depth of water of 8 to 16 fathoms. In east bay the depths are about the same, but the bottom is mostly hard.

There are no streams, but a small quantity of water constantly trickles out of the base of the hill on to the beach at the head of west bay. There is no timber or scrub, but the islands are covered with verdure. There are no land-animals, and consequently this place is resorted to by myriads of sea-fowl as a breeding-ground.

SREDNOI STRAIT.—North of Ushishir is Srednoi Strait, the most dangerous of all the channels between the islands. It is 9 miles wide from the north point of Ushishir to the south point of Rashau. A ledge appears to extend right across this strait with varying depths of water upon it, it being deepest between Srednoi reef and Rashau.

Srednoi reef is a long patch of rocks, partly above and partly below the surface of the sea, lying nearly 3 miles off the north end of Ushishir. It is about two miles in length, running north-north-west and south-south-east. The westernmost extremity of this reef is a mass of black rocks about two or three cables long and some 60 feet high in parts, having a rugged hummocky or battlement-shaped appearance. Across a passage about a cable and a half wide, in which there is a depth of water of from 5 to 10 fathoms, is a flattish oval-shaped rock, about a couple of hundred yards in extent, and 15 or 16 feet above the sea at its highest part.

This rock is frequented by many thousands of sea-lions. Fur-seals used to be numerous here also, over five thousand being taken in the summer of 1881 from this particular rock.

The remainder of the reef is mostly under water, a few small rocks showing above at its eastern extremity. About halfway between the north point of Ushishir and the Srednoi Black rock there is a "button" rock only a few feet out of water, with a depth of 11 to 12 fathoms all round it. Immense beds of kelp grow around the Srednoi reef, which are favourite resorts of the sea-otter.

Between the reef and Rashau the channel is deeper and safe to take in fine weather, but there are rocks lying some distance off the south point of Rashau, another "button" rock showing above water about 2 miles to the southward of this point.

Through these straits the tides and currents rush with great

velocity, giving rise to tremendous rips. At times a strong breeze is necessary to enable a vessel to stem the current.

RASHAU, the next island to the north-eastward, is somewhat oval-shaped, about 9 miles long north and south, and 5 broad east and west at its widest part. It has an area of 25 square miles.

The mountains of this island form an irregular mass, with several peaks, the highest of which reaches an elevation of 3300 feet. On the eastern side there is a crater giving off steam, around which there appears to be a deposit of sulphur. About 2 miles from the south point, on the western side of the island, is an old deserted Ainu settlement.

There are no good anchorages. The coast is everywhere steep, and there are many rocks around it, particularly off the north and south ends; but the water is, as a rule, deep close in to them.

Water is not readily procurable here, the accessible streams, which are but small driblets running down over the cliffs, not being near a possible anchorage. The lower parts of the island are moss and grass grown, and near the bottom of the slopes of the cliffs *fuki* and other coarse vegetation grow in great profusion.

There are no land-animals but foxes, which are very numerous. Ravens, falcons, wagtails, and wrens are the only land-birds I have noticed. A few shore-birds, sandpipers and dotterels, are also to be seen. The various sea-fowl frequenting the Kurils are plentiful.

There are no fish to be caught here. Sea-otters, leopard seals, and sea-lions are to be met with around the coast, but there are no sea-lion rookeries on this island.

NADEJDA STRAIT, the channel between Rashau and Matau, is 14 miles wide. It is free from dangers, except that off the south end of Matau a long reef extends in a southerly direction for nearly 2 miles. This reef is awash in places, and is covered with kelp.

MATAU is about 6½ miles long, and rather more than 4 wide. Its area is 20 square miles.

The grand volcanic cone forming this island is 5120 feet high. Steam issues from this mountain, and occasionally small streams of lava flow from the crater down the north-eastern slope. On the south-east slope, towards the top, a small shoulder projects.

The western, northern, and north-eastern coasts are rock-bound, and end in high steep cliffs with deep water close in to the shore

The mountain has a long slope to the south-east, where the island makes out into a few low hills and terraces of pumiceous and sandy earth, gradually descending to the south shore, which has a sandy beach. The long reef already mentioned extends from the western point of the south shore, and there is another but shorter reef off the east point of it.

A small island, about a mile in extent, called Puffin Island, lies off the east side of Matau. It is not more than about 200 feet high, and has an undulating surface covered with grasses and moss. It is not shown on any published charts.

The best anchorages are inside Puffin Island, in from 3 to 9 fathoms; and in Ainu Bay, in the south-western corner of Matau, in from 8 to 14 fathoms, with a sandy bottom. In this portion of the island is an old Ainu village, consisting of a score or more dwellings.

Water can be procured from a small stream, and driftwood from the beach.

Foxes are found here. There is a small sea-lion rookery on the north side of the island, and a few leopard seals and sea-otters are to be found. Land and shore birds are very few, but sea-fowl are abundant, the cliffs around the northern shores being favourite breeding-places for innumerable guillemots, gulls, and shags.

Golovin Strait, between Matau and Raikoke, is 9 miles wide, and free from dangers.

Raikoke, which lies due north of Matau, is a round-shaped island only about a mile in diameter, and some 2050 feet in height. It is an extinct volcanic cone, with its apex much broken away, which, when looked at from certain directions, gives it a somewhat flat appearance on top.

The slopes of the mountain are very steep, and covered with loose volcanic cinders, making it necessary, when making the ascent, to proceed on all fours in some places. The crater is from 100 to 200 feet or thereabouts in depth, with steep sides.

There is no wood or water on the island, and but a very scanty growth of vegetation on its lower parts.

The water is deep all round the island, but it is possible to anchor off the south side in from 13 to 16 fathoms.

There are no land-animals. Sea-fowl, particularly fulmars, auks, puffins, shags, and guillemots, are numerous.

Immense numbers of sea-lions are found here. In a rocky bight on the west side is a fur-seal rookery, but only a few scores of these animals are now captured at this place. In 1883, this rookery was frequented by at least 15,000 fur-seals.

MUSHIR STRAIT, between Raikoke and Shiashkotan, is 40 miles across. In this strait are the Mushir rocks, a group of islets lying 30 miles north-east by east from Raikoke, and 11 miles in a south-south-westerly direction from the south-west end of Shiaskotan. There are four principal rocks, known as Long rock, Bluff rock, Low rock, and Seal rock.

Long rock is the northernmost. It is about 80 feet high, and is cleft into two small peaks on top. Some grass grows on it. It is not difficult to land upon, as there are many small rocks and kelp-beds around it which break the seas. A reef, mostly above water, extends from this to Bluff rock, which is about 140 feet high. It is flat-topped, with very steep sides, and is split through the middle perpendicularly. Low rock, the next, is small and only a few feet above water. Seal rock is bare and jagged, of a cleft pyramidal form, and about 140 feet high.

These islets and reefs lie in the form of a crescent about a mile in diameter, open to the westward, and are probably part of the rim of an old submarine crater. Much kelp grows around these rocks and reefs on every side.

Anchorage can be got inside the crescent in from 10 to 15 fathoms, and also outside, to the north-east, in from 10 to 16 fathoms, with rocky bottom. Strong currents set through, causing swirls and heavy rips at times.

There are many sea-lions here, and fur-seals are sometimes to be found on Seal rock. Some thousands were taken here a few years ago. A few leopard seals and an occasional sea-otter are to be met with also. The sea-fowl are fulmars, shags, gulls, puffins, guillemots, and auks of various kinds.

There are no other dangers than the Mushir rocks in the Mushir Strait.

SHIASHKOTAN is nearly 13 miles in length, and from $\frac{1}{2}$ to $4\frac{1}{2}$ miles wide. Its area is $34\frac{1}{2}$ square miles.

This island has a mass of mountains at each end, connected by a stretch of level land between, about half a mile in width, and some 80 to 100 feet above the sea. The southern mountain has a broadly

rounded or somewhat flattish top, with no prominent peak. Its height is 2950 feet. On its western side there is a crater giving off much steam, in which there is a deposit of sulphur.

The northern part shows two peaks, which rise to a height of 3050 feet. From one of these steam issues, and there is a deposit of sulphur on the north side. The whole coast is rocky, and much kelp grows around the island.

The best anchorage is on the west side in Otomé Bay, in from 10 to 14 fathoms, with sandy soundings. A vessel can also anchor off the north shore in from 9 to 15 fathoms. About the middle of the island, on the Pacific side, off the low land, a reef (Otter reef) extends, on either side of which it is possible to anchor, but it is by no means a good place. The bottom is sandy, and the depth of water 15 fathoms. Water can be obtained from two or three small streams which run down over the cliffs at the head of Otomé Bay. There is plenty of driftwood on the beach.

The island, except the higher parts, is covered with grasses and mosses, and there is a small quantity of scrub on its north-western part. Foxes are the only land-animals. Sea-birds, though plentiful, are not so numerous as on most of the other islands. There are no sea-lion rookeries. Leopard seals are fairly plentiful. Sea-otters were numerous some years ago, but they have been nearly all killed off or driven away.

Ekarma, separated from Shiashkotan by Ekarma Strait, is about $3\frac{3}{4}$ miles long east and west, by $2\frac{1}{4}$ miles wide north and south. Its area is $5\frac{1}{2}$ square miles. The strait is about $3\frac{1}{4}$ miles across at the narrowest part, and is free from dangers. On the western side of Ekarma, a volcanic peak rises to a height of 4150 feet. From this a ridge about 2800 feet high extends in an easterly direction, terminating in high steep cliffs. The slopes of the volcano are bare of vegetation, and covered with loose volcanic ejectamenta. The mountain is not active, but at its base on the north side there are warm springs.

The shores are bounded mostly by abrupt cliffs. The eastern and northern sides have steeply sloping grass-grown cliffs, with a bouldery beach at the foot. The lower parts of the island on the eastern half have a growth of grasses and mosses, with some scrub on the northern slopes.

The best place to anchor on this island is on the south-eastern

side, in from 10 to 15 fathoms, with a hard bottom. There are no off-lying dangers, and the coast may be approached with safety on all sides.

On the north-east point there is a sea-lion rookery. Leopard seals and a few sea-otters are to be found. There are no land-animals. Sea-fowl are numerous. Ptarmigan have been seen here, and a few wild geese (*Bernida Hutchinsi*) breed on the island.

CHIRINKOTAN, lying about 16 miles to the westward of Ekarma, is 2400 feet high, and about 4 miles in circumference; its area one square mile. This island has a double volcanic cone, the outer one being breached on the south-east side. Steam issues from this crater, and at times lava flows through the breach and down the side of the mountain into the sea.

The south-east side of the island is almost bare of vegetation, but the east, north, and north-west slopes have a growth of grasses and mosses upon them. The shores are mostly bold, ending in cliffs, but on the north-west side there is a bouldery beach. Sea-fowl breed here in large numbers, as they do on all the other islands where there are no land-animals. There are no sea-lion rookeries. A stray sea-otter occasionally finds its way here, and there are a few leopard seals.

There are no dangers in the strait between Ekarma and Chirinkotan.

SHIASHKOTAN STRAIT is 15 miles wide, and free from dangers.

KHARIMKOTAN, the next island to the north-east, has an area of 16 square miles. Its length north-west and south-east is about $6\frac{1}{2}$ miles, its width being about $3\frac{1}{2}$ miles. Near its centre rises a double truncated cone to a height of 4050 feet.

The walls of the outer cone are broken away, and a breach formed on the eastern side, from which a mass of volcanic matter has run down towards the sea, and formed the low eastern point of the island. On the north side of this lava-stream, covering the lower slopes of the mountain, is an expanse of yellow-looking matter, which from a distance has the appearance of brimstone, or pumice that had been melted.

On the northern slope of the mountain are two small parasitic peaks and a short ridge. The north-western portion of the island is low, and made up of sand-dunes and hills, between which there are small lakes and ponds.

On the northern corner of Kharimkotan is a bay with sandy shores, and on the north-west point there is an old village of the usual kind found on these islands.

Anchorage can be got in the bay in from 6 to 12 fathoms. Water can be obtained, and there is plenty of driftwood on the beaches. Some low scrub grows, but there is no timber. The lower parts of the island are covered with vegetation.

The whole island is surrounded in the summer by an unbroken belt of kelp, about a quarter of a mile wide, with from 8 to 15 fathoms of water along its edge.

Excepting the two lower portions, the coast is bordered by high steep cliffs, with a bouldery beach at their base. There are no dangers around the coast, this island being the freest from reefs and rocks in the whole chain.

Foxes are common. The ever-present leopard seal is here, but sea-otters and sea-lions are seldom seen. Sea-fowl are comparatively few in numbers, the reasons being that there are no suitable breeding-places. Swans, geese, ducks, divers, and other water-fowl frequent the lakelets and ponds among the sandhills. A few codfish may be caught off the north-west bay.

Sixth (Shesto) Strait, separating Kharimkotan from Onekotan, is 7 miles broad.

Onekotan has a length of 27 miles. For about two-thirds of its length from the north-east end, it has an almost uniform width of about 4½ miles; it then bulges out into a more or less circular form, with a diameter of about 9 miles. The area of the island is 121 square miles.

Onekotan has two principal peaks, rising far above the rest of its high parts. Mount Blakiston, in the centre of the south-west portion of the island, is a volcanic cone 4400 feet high. It is situated in a basin of hills, its slopes nowhere approaching the coast. This basin is probably an old crater of considerable extent, the surrounding hills being the remains of its outer walls.

Mount Nemo, another volcanic peak on the western side of the northern portion of the island, is 3300 feet high. There are several smaller peaks on the north-east end, and some rounded mountains and ridges near the middle of the island.

The coast on the Okhotsk sea side of Onekotan is steep and practically straight up to Cape Nemo. It then makes in and

forms Nemo Bay, where a fair anchorage can be got in from 10 to 13 fathoms, with sandy surroundings. A stream of good water runs into this bay, where salmon and trout may be obtained in the season.

A short reef extends off Cape Kimberley, the north-west point of the island. Cape Littlejohn, the north-east point, has a high rock lying a short distance off it. About the middle of the coast, on the Pacific side, are the remains of an old village. To the southward of this the land forms Blakiston Bay, which affords anchorage on a sandy bottom in from 9 to 12 fathoms. From Blakiston Bay, around the southern part of the island, the coast terminates in high, abrupt, black-looking cliffs, and with little or no beach. A considerable quantity of kelp grows around the island. The coast is safe to approach, there being no off-lying dangers.

Leopard seals are common; sea-otters and sea-lions are met with, but there are no sea-lion rookeries on the island. Foxes and a small rodent (lemming) are the only land-animals.

Vegetation now begins again to be more profuse. The valleys have a rank growth of grass, nettles, and umbelliferous plants, the slopes of the hills and flats are covered with mosses and other close-growing greenery, and wild flowers of many kinds are abundant. There is a growth of scrub in places, but no trees.

Onekotan is not a favourite breeding-ground for sea-fowl. Codfish are to be caught off the coast, but not in large numbers.

Fifth (Piati) Strait, between Onekotan and Makanrushir, is 13 miles wide, with deep water throughout.

Makanrushir is roughly oval in form. Its greatest length is 6 miles north and south, and its width east and west is $4\frac{1}{2}$ miles. It has an area of $21\frac{1}{2}$ square miles. This island is made up of an irregular mass of mountains showing several peaks, but there is no well-formed prominent cone. The mountains, which reach to a height of 3900 feet, are volcanic, but at the present time there is no activity.

The northern and north-eastern beaches are bouldery, with a short stretch of hillocky low land at back. The southern coast is similar. Elsewhere all around the island the shore is bounded by lofty cliffs, with a narrow beach at their foot.

There are no good anchorages, but off the lower parts of the

island the soundings are from 7 to 17 fathoms, a safe distance from the beach. On the west and south-west sides there are some off-lying rocks.

The low ground and the lower slopes of the mountains are green with vegetation, which here and there includes a little scrub.

Cod and rock-fish are plentiful.

Sea-birds in great numbers are to be found. Foxes exist here, but no other land-animal. Leopard seals are numerous, and sea-otters rare. Sea-lions are seen around the island, but there are no rookeries on it.

Many beds of kelp grow around the coast.

Avos Rock, or Avos Island as it is called on charts, is merely a whitish-looking steep, bare rock, about 200 feet high, roughly pyramidal in form, with a base of some 30 or 40 yards. At a distance it has the appearance of a vessel under full sail. Within a cable's length of the high rock are four other smaller ones, 20 or 30 feet above water, and beyond these, extending about two cables' length, is a kelp patch, at the end of which there is a rock just awash. A short distance off, a depth of from 30 to 35 fathoms was found all around the rocks and shoal.

Sea-lions "haul out" on these rocks, but do not breed here. Guillemots, kittiwake gulls, and shags are plentiful, and in June their eggs can be obtained in thousands.

Avos rock bears west a quarter south from the south point of Makanrushir, about 10 miles. It is not laid down correctly on charts.

Amphitrite Strait, between Onekotan and Paramushir, is 28 miles wide. This channel is generally used by vessels crossing the Okhotsk Sea, bound to and from Petropaulovski. In thick or hazy weather it is advisable to give the Paramushir side of the strait a wide berth. The currents are strong, and both Cape Kapari and Cape Henry have reefs and rocks off them to a considerable distance. Being low, these points are often difficult to make out when the higher land is plainly visible.

Paramushir is one of the largest islands in the Kuril chain. It has an area of 562 square miles, is 57 miles in length, and has an average width of about 10 miles.

This island is more universally mountainous than any other of the larger ones. It has several noble volcanoes, the most prominent

of which is Fuss peak, which stands on a small peninsula on the western side of the southern part of the island. This mountain is a magnificent solitary cone, with gracefully sloping sides, ending in steep cliffs around the shores at its base. It is one of the loftiest mountains in the islands, its height being 6900 feet. Mount Chikuratski, lying about 10 miles further to the east-north-east, is another grand volcano rising to a height of 6400 feet. From this, extending in a southerly direction, is a ridge of high mountains with many peaks of rather less elevation than Chikuratski.

The northern end of Paramushir shows a mass of mountains. They are highest on the western side, where they reach an elevation of 4700 feet. The only visible volcanic activity on the island is in this group, steam issuing from a crater near the centre. Mount Levacheff, on the Pacific side of the north-east end, is an old volcano 3300 feet high. The middle part of the island has mountain ridges of less elevation, with many peaks.

The north-western or Okhotsk Sea side of Paramushir, like this side of all the other islands, is the boldest and steepest. It ends mostly in high cliffs with bouldery beaches at their bases. There are few rocks on this side.

The Pacific or south-east coast of Paramushir is less steep, with less depth of water off it, and there are many rocks.

The south-east corner of the island is low, ending in Cape Henry. The water to the eastward and north-east of the point is shallow, and there are roofs and rocks off it to a distance of nearly 2 miles. To the westward of Cape Henry, anchorage may be got in from 12 to 16 fathoms. Cape Kapari is low, and many rocks lie off it. The remains of an old Ainu settlement are to be seen here.

There is no timber on Paramushir, but scrub, pine, alders, etc., grow in profusion on the lower slopes of the hills.

Bears, foxes, and a small rodent comprise the land-animals of this island. The bears are the same as those of Kamchatka. They are fairly numerous. Ptarmigan are found, but other land-birds are not numerous. Some shore-birds and waders are to be met with, and the lagoons and streams are frequented by water-fowl. The usual sea-fowl common to the other islands are found around the coast.

Leopard seals are common, and sea-otters scarce. Sea-lions frequent the coast, but there are no rookeries on the island.

There are trout in the streams, and salmon trout are plentiful towards the end of July. Cod, halibut, and rock-fish abound in certain places off the coast.

SHIRINKI is separated from Paramushir by a channel about 5 miles across its narrowest part. It has deep water throughout. On charts it is called Third (Treti) Strait, although it is the *fourth* channel between the islands counting from Kamchatka. The area of Shirinki is about $1\frac{3}{4}$ square mile. It is about 2 miles long and 1 broad. Looked at from a south-west direction, it has the appearance of a rugged volcanic cone with a broad and dilapidated crater lip, but viewed from the eastward, it is seen to form a ridge with several irregular projections. The western side, where the old crater is situated, is the highest, reaching an elevation of 2500 feet. The western side of the island terminates in lofty perpendicular cliffs. The northern coast is not so steep, and has a margin of bouldery beach. A small cove makes in from the east point, where there is a very small stretch of low land. All the rest of the coast is high and steep. Close in to the west point are two large rocks, on which sea-lions haul out to breed. There is also a large rookery of these animals on a rocky ledge on the south point.

There is anchorage in from 10 to 15 fathoms, with rocky bottom, off the north shore.

Myriads of guillemots occupy the ledges of the cliffs on this side of the island, and other sea-fowl are numerous.

The lower parts of the island are green with grass and mosses. There is no scrub and no stream of water.

Occasionally a sea-otter may be met with in the kelp-beds around Shirinki. Leopard seals are common, and sea-lions very numerous.

ALAID STRAIT, the channel between the north-western part of Paramushir and Alaid Island, is 15 miles wide, and is without dangers.

ALAID, the most northern of the Kurils, is about 26 miles in circumference, and has an area of 48 square miles. It is the loftiest island in the whole chain, its peak reaching to a height of 7640 feet. This volcano is no longer active—at least, there are no visible signs of activity. The slopes of this grand mountain sweep with a graceful curve towards the sea, in most places ending in low cliffs. On the south-east side a stream of lava has flown down and formed a

low point. On the north side of this point there are a few old Ainu huts, which these natives used on their periodical hunting trips to the island for the capture of sea-lions. On the north-western side, on a cluster of rocks, there is a rookery of these animals. Leopard seals are common, but sea-otters have not been seen here during the last fifteen years.

Foxes are the only land-animals. Sea-birds are not so numerous as at most of the other islands.

There are no good streams of water. Fish are plentiful off the coast.

There are no trees, but the lower parts of the island are covered with grasses, mosses, and scrub.

The coast is safe to approach, and anchorage can be got on the south-east, east, and north sides in from 9 to 15 fathoms.

Little Kuril Strait, separating Paramushir from Shumshir or Pervi Island, is the narrowest of all the channels through the islands, being, at its narrowest part, not more than a mile wide.

From the Pacific there are three entrances to this strait—the first between Cape Levasheff and Bird rocks, which is $2\frac{1}{2}$ miles wide, and has a depth of 12 to 17 fathoms; the second, between Bird rocks and Kohskar rock, 6 miles wide, with a depth of 14 to 20 fathoms; and the third, between Kokskar rock and Pinnacles point, the south-east cape of Shumshir, about 5 miles wide. In this passage, about 2 miles to the north three-quarter east of the Kokskar rock, is a patch of rocks just awash. In the channel between this shoal and Pinnacles point there is from 13 to 20 fathoms of water.

The western or Paramushir side of Little Kuril Strait is indented with several bays having sandy beaches. This side is free from off-lying dangers, but it is advisable not to approach too close to Low point, 4 miles to the north of Cape Levasheff.

The Shumshir side of the strait, from Mairuppo Bay southwards and round the shore to Pinnacles point has several off-lying rocks.

The tidal streams set with considerable velocity through this strait, the flood to the northward and the ebb to the south, at springs sometimes attaining four or five knots. Swirls and rips are formed, the heaviest being generally across the channel about a mile and a half inside the northern entrance. The rise and fall is about 6 feet at spring tides.

Bird Islands or Rocks, 3 miles east of Cape Levasheff, are three small islets named Ganimushir, Kotanimushir, and Chirimushir. They lie in a crescent form, opening towards the south-east. Ganimushir, the southernmost, is, in its main part, about 100 feet high, and somewhat dome-shaped. From the high part it runs out low and flat in a southerly direction, terminating in a narrow high rock, which from a distance appears to be separated from the main part.

About a mile south of this islet there is a large field of kelp, in which there are some blind breakers. Between this shoal and the islet there is from 9 to 10 fathoms of water. From the northern side of Ganimushir a kelp-covered reef extends to Kotanimushir, the northernmost islet, about half a mile distant. Between this islet and Chirimushir, the eastern islet, there is also a reef. These two islets are not quite so high as the southern one. They are partly covered with grass, and are the breeding-places of innumerable sea-fowl, guillemots, puffins, auks, fulmars, gulls, and shags being the most plentiful. Sometimes a sea-otter is seen here, and there are always leopard seals. Codfish and halibut are abundant in the vicinity.

Kokskar Rock, lying 6 miles east-north-east from the Bird Islands, is a long irregular mass of black-looking rock, some 15 or 20 feet above water. It is used as a breeding-place by sea-lions. The water is to within a short distance of the rock.

Shumshir, the last of the Kuril chain of islands, is 89 square miles in extent. It is about 14 miles in length north and south, and 11 broad east and west at its widest part.

Inasmuch as it has no mountains, it is unlike any other of the Kuril Islands. Its principal features are undulating hills and swampy valleys, with a growth of scrub, pine, alder, grasses, mosses, etc. The highest part of the island is on its northern side, where it reaches an elevation of about 580 feet.

In the north-western part, about a mile back from the coast, there is a fair-sized shallow lake, from which a stream flows into the sea. On the bank of this stream, amongst some sandhills, there is a deserted village of some twenty or thirty dwellings, around some of which small patches of ground have been roughly fenced in and cultivated. About 3 miles to the south-west, in Mairuppo Bay, Little Kuril Strait, is another old settlement.

There are many small streams of good water, in some of which, and also in the lake, in July and August, salmon-trout are plentiful.

The north-west coast of Shumshir, between Cape Pervi and Cape Chaconchi, forms a broad bay—known as Cod Bay—6 miles across. The capes are rocky, and extending off the first-named for nearly a mile in a north-easterly direction there is a reef with kelp upon it. The shores of the bay are backed by low sandhills, the beach being sandy. Cod Bay offers a fair anchorage in from 10 to 15 fathoms with sandy soundings. Elsewhere the coast of Shumshir terminates mostly in low cliffs, the points and capes being steep and rocky, whilst the heads of the bights generally have sandy beaches, with sloping grass-grown cliffs at their backs.

The east coast can with safety be approached anywhere within a mile or less. Much kelp grows here. Fish may be caught almost anywhere off the coast. A few sea-otters are to be found, and leopard seals are numerous.

Foxes are plentiful, and there are a few bears. In places the ground is honeycombed by the small rodent already mentioned as being found on Onekotan and Paramushir. Ptarmigan, a few snipe, plover, and shore-birds are to be found. Swans, geese, ducks, divers, and other water-fowl are met with on the lake and streams.

Kuril Strait, separating Shumshir from Kamchatka, is 7 miles wide, but its navigable channel is narrowed to about half that distance by a dangerous reef, which extends from Cape Lopatka, the south point of Kamchatka, in a north-westerly direction for about 9 miles. At that distance from the cape, on the end of the reef, there is but 3 fathoms of water. Off the north-east point of Shumshir a reef makes out a short distance, and there is another off the next point to the southward, extending in a semicircular form partly across the bay between the two points. This reef is under water, and only shows when there is a swell or heavy sea. Nearly the whole of the Lopatka reef is also under water, there being but one or two rocks awash.

A line of soundings from north-east Cape Shumshir to Cape Lopatka, which lie nearly east and west of each other, showed from 8 to 17 in mid-channel to 7 fathoms off Cape Lopatka, approaching to within less than a mile off both capes.

The tides set through this strait with great speed at times, causing heavy rips, particularly off the points and along the reefs.

Cape Lopatka is a long, low, undulating tongue of land, terminating in a narrow point of grass-covered sand-dunes. The beach is sandy on the Okhotsk Sea side, and rocky on the Pacific side. Several rocks lie off the extreme point, and reefs extend off the shore on the Pacific side to about a mile. Large beds of kelp grow around the cape, but the weed is often carried under water out of sight by the strong currents. Between the Lopatka reef and the Kamchatka shore, down to within about 2 miles of the cape, a depth of 7 to 15 fathoms was found.

ADDENDA.

General Remarks.—When Japan, in 1875, gave up her possessions in Saghalin to Russia in exchange for the Northern Kuril Islands, she may, perhaps, have done a wise thing politically, but there is no doubt that from a business point she made a bad bargain. On Saghalin there are valuable herring, salmon, seaweed, and other fisheries which the Japanese had exploited for many years, and, in addition to these, it has minerals, timber, and peltries.

The Northern Kurils, so far as was then known to the Japanese, had little or nothing of the kind. Timber there is none; cultivation, for climatic reasons, is out of the question; and the fisheries are poor. There are certainly a few small deposits of sulphur, which, however, at present will not pay to work. The chief value of the islands lay in the sea-otter and seal fisheries. At the time of the exchange, however, fur seals were not known to frequent the Kurils for breeding purposes, and it was not until 1881, when their rookeries were rediscovered * by the writer, that their existence became known to the Japanese.

The fur-seal rookeries of the Kurils are, or rather were, three in number, viz. on Srednoi rocks, Raikoke Islands, and Mushir rocks. Eleven years ago some twelve or fifteen thousand seals frequented each of the two first-named rookeries, and about two or three thousand the last-named, whilst now it is doubtful if altogether a hundred of these animals "haul up" at these places. They have been exterminated by the indiscriminate slaughter of old and young on the rookeries by both Japanese and foreign hunters.

The fur seals on the Kurils commence to "haul up" in June. The "bulls" arrive first, and take up positions on the rookeries. A few females arrive about the end of June, but the majority during the first ten days of July.

Very soon after "hauling up" the female gives birth to her one "pup," and from three to five days afterwards she receives the male. The period of gestation of the fur seal is therefore about 360 days. The seals remain on the rookeries until the end of October or the beginning of November. The first heavy fall of snow usually drives them all off.

Each male able to fight and hold his own has a harem of from about seven to twenty females. Much fighting takes place between the bulls during the time the females are hauling up. The young bachelors who are not strong enough to maintain a position on the breeding-grounds are driven off by the old bulls, and haul up by themselves; but towards the end of the season, when the cause for jealousy no longer exists, they become more or less mixed up with the others.

* Many years ago, in the days of the old Russian-American Co., fur seals are mentioned as being obtained in small numbers from the Kurils.

A full-grown male, or "bull," as he is called, six or seven years old, measures nearly 7 feet in length, and weighs about 400 lbs. Some of the older ones at the beginning of the season, when they are exceedingly fat, will probably weigh 25 per cent. more than this. A full-grown female, or "cow," measures about 4½ feet in length, and averages about 85 lbs. in weight.

The cry of the female fur seal and the young ones is very much like that of the sheep. Sea-sheep would be a much more appropriate name for this animal than sea-bear. They herd together like sheep, can be driven like sheep, and bleat like sheep. They have little or nothing in common with the bear.

The flesh of the fur seal is very palatable when properly cooked. It must, however, be divested of every particle of fat, which is strong and rank. According to the Japanese, the flesh contains strong aphrodisiac qualities. In flavour it is not unlike venison. One of the Japanese names for the deer or venison is *yama ottosei* (mountain fur seal). The liver, heart, and tongue are quite equal to those of the sheep in flavour.

Pelagic sealing is now carried on off the coasts of Japan in the spring by four or five vessels, each one of which makes a catch of from 1200 to 2000 seals. The hunting-grounds are from 25 to 150 miles off shore.

Could the sea-lion be put to some profitable use, there is abundant material on the Kuril Islands, which contain probably some of the largest sea-lion rookeries in the world. On the eighteen breeding rookeries, at least a hundred thousand of these animals haul up every season. The habits of the sea-lion and fur seal are almost identical. The female produces one at a birth, which is born in June. She goes with young nearly twelve months. The old bulls have each a harem of from six to ten females. The younger bulls are driven off, and much fighting goes on between the bulls over the females. The sea-lion pups take to the water much earlier than the fur seal pups. A full-grown bull, at the commencement of the breeding season, will weigh from 1200 to 1500 lbs., and a full-grown cow nearly half as much. The bull will measure from 10 to 11 feet in length, with a girth of 8 or 9 feet around the shoulders.

The skin of the sea-lion makes but poor leather. For his size he yields but little oil, his blubber being of a very gristly nature. The long whiskers of the male, which measure from 20 to 22 inches in length, are much appreciated by the Chinese, who also use the gall, testes, and bone of the penis for medicinal purposes. The large canine teeth, some of which are nearly 4 inches in length, and of the consistency of ivory, are sometimes carved by the Japanese into *netsuki*.

The flesh of the sea-lion is particularly good eating. Even the fat is not disagreeable in flavour, like that of the fur seal and hair seal. The meat, though coarse in grain, is tender, juicy, and easily digested. It makes a capital soup.

The sea-lion must have many natural enemies, or its numbers would increase enormously and soon outnumber the fur seal. The young take to the water much earlier than the fur seal pups, and, being awkward and less agile than the fur seal, probably fall victims in large numbers to sharks and killer whales (*Orca gladiator*).

Although considerable numbers of hair seals (*Phoca vitulura*) are to be found on the Kurils, the pursuit of this animal is never likely to be remunerative, for their commercial value is very small. One hair seal will yield twice as much oil as a sea-lion four or five times its size. They breed in June, and produce one at a

birth. They do not associate in rookeries. The female usually hauls up alone on some low rock or rocky ledge or beach to give birth to her young, which very soon takes to the water. This seal does not appear to be polygamous. During fine weather it is not unusual to see a dozen or more of these seals lying basking on rocks or ledges just awash or a little above the water. When approached, they scramble into the water, and will then swim round and venture close to a boat with little apparent fear, as if to gratify their curiosity. On making a movement, they will disappear beneath the surface of the sea, to appear again in a few minutes or seconds. These seals almost invariably sink beneath the surface hind parts first, whereas the sea-lions, fur seals, and sea-otters almost as invariably turn over and go down head first.

The hair seal is usually silent, but it occasionally emits a sound—a single short bark, not unlike that of a dog.

The meat of the hair seal is very dark and coarse-grained, and the fat is very strong. It contains an immense quantity of blood.

Whilst the seal rookeries are deserted, the sea-otter has become so scarce that not more than seventy or eighty are now taken in a year along the whole chain of the Kurils. The sea-otter has been continuously hunted since 1873, chiefly by foreign vessels, and by the Japanese (after they found out the value of the animal, which they knew little or nothing about previous to 1874) from stations on shore and latterly from schooners under the Japanese flag.

Although sea-otter skins in the London market realize from £15 to £210 *each*, according to quality, this animal has been so reduced in numbers, and is now so difficult of approach, that hunting it from a vessel no longer pays.

The state of affairs to which the Kuril Islands are now reduced in regard to fur seals and sea-otters might have been very different, and the seal rookeries preserved and made a lasting source of revenue, had the Japanese Government taken proper means to exploit them. The Government have no one to blame but themselves and their own officials. Time after time their attention was called to the importance of the matter, but apparently, owing to their reluctance to employ any foreigners to manage the business or give advice upon it, or to allow them to lease the right of taking seals, etc., or to be interested in the business with Japanese, the opportunity to secure the only benefit the Government were ever likely to obtain from their unfortunate bargain with Russia has probably been lost for ever. Without foreign assistance and advice the Japanese cannot manage this industry. They have tried it over and over again, but their experiments have always ended in disastrous failure and loss.

The sea-otters of the Kuril Islands are particularly fine; some of the handsomest skins which find their way into the London market are taken there.

The favourite haunts of this animal are off the rocky points and reefs where kelp is plentiful. The ends and the Pacific side of the islands are most frequented. On the Okhotsk or north-west sides of the islands it is rarely that an otter is found. The reasons for this are, probably, that the Pacific or south-east side is the lee side during the severe winter and spring weather, and they are not so liable to be hemmed in by ice-fields. In the summer, too, it is the foggy side, thus offering them greater protection from their human enemies.

The food of the sea-otter, which chiefly consists of sea-urchins, crabs, sea-apples, etc., is everywhere abundant on the islands, particularly in the immense kelp-fields,

on which the otter, when undisturbed, loves to lie and be rocked by the heaving of the ocean swell.

After a period of rest from being hunted, the otters "school up" in the kelp-patches. Formerly it was not unusual to fall in with "schools" of twenty to over a hundred or more, but now it is a rare sight to see a dozen together.

During the hunting season the otters lie mostly off shore, from 5 to 15 miles away from the land. They come in to the kelp-patches in stormy weather, and also at night to feed, leaving again before daylight.

The sea-otter is not polygamous. The female, as a rule, produces but one at a birth; but instances of two have been known. The writer had come under his observation one such case, when two fœtuses were taken from the womb of a dead otter. The otter does not leave the water to give birth to its young, but usually seeks a kelp-patch for the purpose. Often, however, the young one is born in the open sea. The female is much attached to her young, and when hunted will cling to it until she is killed or badly wounded, or until the "pup" is drowned by her constant diving. When diving, the "pup" is carried in its mother's mouth by the skin at the back of the neck; and when on the surface, the pup is carried on the mother's breast, she swimming on her back, which is the usual position of an otter when above water.

The sea-otter has no particular breeding season; "pups" of all ages are met with in every month of the year. The period of gestation is not known for certain; neither is the age at which the female commences to breed. The sea-otter will not live in captivity, and it is of such a shy nature that good opportunities of observing its habits and life-history are rarely if ever offered.

The cry of the sea-otter is like that of a cat, but somewhat harsher. In hunting an otter carrying her "pup," the mother's whereabouts is constantly betrayed by the mewing of the little one.

The sea-otter has usually been hunted on this side the Pacific from schooners carrying three boats. Each boat is manned by five or six men, including the hunter, who stands in the bow on the look-out armed with a rifle. In fine weather the boats leave the vessel before daylight, and spread out in line. When an otter is seen a signal is given, and the boats take up positions some 600 or 800 yards apart in the form of a triangle, the otter being inside. Each time the otter comes to the surface to breathe he is fired at by the nearest boat, the others following if the otter does not dive immediately. As soon as he disappears, the boats are shifted so as to again have the animal within the triangle when he once more rises to breathe. As the otter tires and his dives become shorter, the boats reduce their distance, when sooner or later the otter is killed.

The weather must be calm and the sea quite smooth, or the "run" of the otter cannot be kept. When being hunted, the otter lies so low in the water, only just exposing its muzzle, that it is difficult to see, and offers but a very small mark for a rifle. Occasionally an otter is killed the first shot, but now and then a strong and cunning fellow will take one or two hours to get. On one occasion the writer saw an otter "run" for four hours, during which time nearly four hundred shots were fired. An otter will often get outside the boats; he will then generally go straight away, breaching every few seconds like a salmon. The nearest boat then takes up the chase, following right in his wake, and firing every time the otter breaks water. The other two boats follow, one on each quarter of the leading boat,

and about 600 yards astern. The otter will eventually make a "back dive" and come up between the boats again. To a sportsman, sea-otter hunting offers one of the most exciting and fascinating of pursuits. To be a successful hunter it is necessary to be a good shot. It also requires considerable judgment, a good eye, smartness, patience, a cool head, a knowledge of the habits of the otter, and a strong constitution. An element that tends to give extra zest to the pursuit of otter-hunting is the rivalry between the boats. Each one naturally likes to secure the otter, but no one must go out of the proper position, and no hunter is supposed to spoil the chance of another in a more favourable position by firing first. The hunters are paid by a "lay," that is, a proportion of the whole catch, not according to what each individual hunter kills himself.

Since 1873 fifty-two vessels have been engaged in hunting the sea-otter on this side the Pacific, chiefly in the waters adjacent to the Kuril Islands. The largest number in any one year was twelve. Some of these vessels were fitted out from San Francisco, and others from Japan. Of these fifty-two vessels thirteen have been lost with all hands (ten on this side and three elsewhere). Seventeen others (twelve on this side and five elsewhere) have been wrecked with loss of twelve lives. Five have been seized and confiscated by Russian cruisers, and fourteen have left the business through want of success, leaving but three which now hunt these waters. Two of these are Japanese and one foreign. The vessels employed are usually schooners of 35 to 100 tons, carrying crews of twenty to twenty-five men.

An adult sea-otter will measure about 4 feet in length, and weigh about 60 or 70 lbs. The skin is remarkably loose on the body, and when stretched and nailed out on a wooden frame to be air-dried, will measure from 85 to 90 inches in length, and from 32 to 36 inches in width. The tail is about 10 inches long.

The Aleuts and other native hunters usually skin their otters "on the round," that is, an incision is made up the hind flippers and through the anus, and the skin drawn off over the head. It is then divested of fat, stuffed with something to keep it stretched, and air-dried. "White" hunters skin their otters by ripping them up from the end of the tail along the belly to the under lip, then up each paw and flipper, so that they "stake out" perfectly flat.

After being "staked out" the skin is "leaned," that is, the adherent fat, etc., is cut cleanly off. The skin is then exposed to the sun, the pelt being scraped to get as much oil out of it as possible. It is left on the frame until quite dry and white, when it is taken off. The fur is then beaten up and the skin put away. The skins are sent to the London market in this condition.

The flesh of the sea-otter is very rank and unsuited to a civilized palate, but many of the northern natives prefer it to any other flesh.

In Yetorup and Kunashir the Japanese, previous to their exchange transaction with Russia, already possessed the largest and most valuable of the Kuril Islands. For peltries these islands are now of but little importance, a few bears and foxes, with an occasional sea-otter, only being taken. Formerly otters were very plentiful off the coast of Yetorup, and more have been taken there than from all the other islands put together. They have been killed off and driven away by continuous hunting.

The value of these islands lies in the fisheries. All their streams and lakes teem with salmon and trout, whilst off the coasts cod, herring, iwashi, halibut, and other fish abound.

Salmon and salmon-trout fishing is pretty vigorously prosecuted on Yetorup and Kunashir. Immense quantities are taken, roughly salted, and shipped to the south. A salmon-canning factory has been established at Shana. Some codfish are caught at Yetorup, but not in large numbers, nearly all attention being given to the capture of salmon and salmon-trout.

On Kunashir and the Yezo coast immense quantities of herring and iwashi (a kind of sardine) are taken, but not for food. Hundreds of tons of these fish are caught and boiled down for their oil and refuse. The oil is sold to foreigners and shipped abroad, and the refuse, called *kasu*, is sent to the south and sold as a fertilizer. Halibut, rock-cod, sea-robins, flounders, smelts, etc., are plentiful, but they are almost entirely neglected. During some seasons one or two streams on Urup are fished for salmon-trout.

Practically speaking, there are no fish on the Kuril Islands between Urup and Onekotan. Off Paramushir and Shumshir there are valuable cod-banks, halibut and other fish are plentiful, and the streams contain salmon and trout. These islands, however, have hitherto been quite neglected.

Although the sealing and sea-otter hunting on the Kurils are practically no longer worth considering, there are several other industries which could be inaugurated, and which, if properly conducted, would yield large profits.

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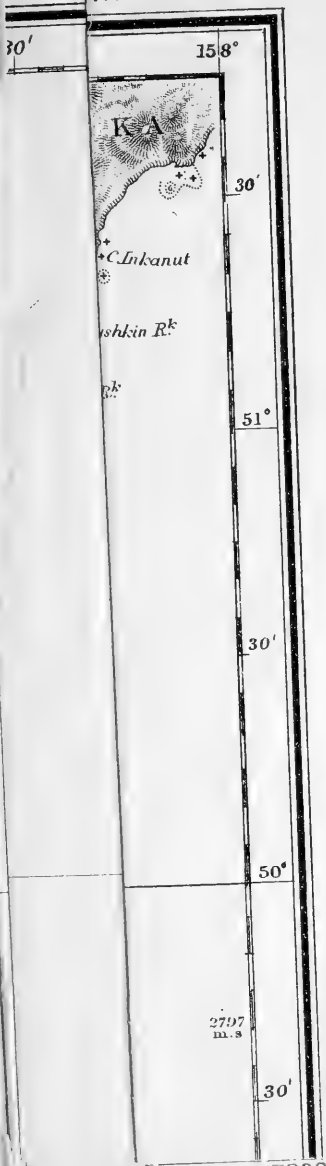

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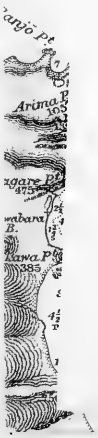

PLANS OF THE KURIL ISLANDS

From Sketches chiefly made by Mr H. J. Snow 1893

SOUNDINGS IN FATHOMS

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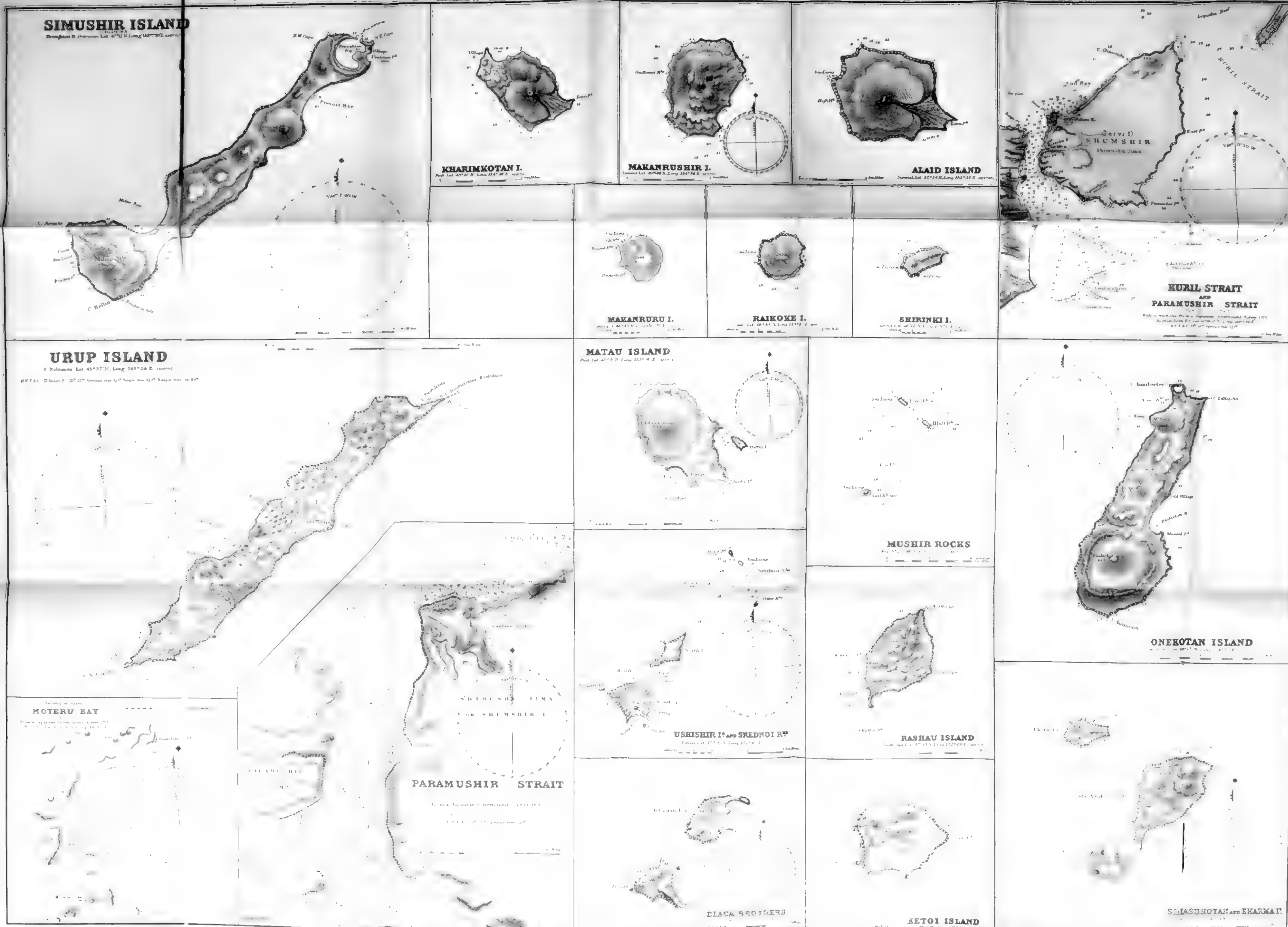

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